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for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

APPELLANT'S BRIEF AND JOINT APPENDIX

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA

No. 8776—Civil

COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA

FILED OCT 2 1944

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JOHN R. CLARK, *Appellant*

vs.

CONWAY P. COE, COMMISSIONER OF PATENTS,
Appellee

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF COLUMBIA

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IN THE

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No. 8776—Civil.

JOHN R. CLARK, *Appellant*

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CONWAY P. COE, COMMISSIONER OF PATENTS,
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APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

BRIEF FOR APPELLANT.

Jurisdictional Statement.

The jurisdiction of this Court for reviewing the judgment of the District Court is based on Sec. 128 of the Judicial Code (28 U. S. C., Sec. 225, 44 Stat. 587). The District Court adjudged (Appellant's App. 12) the Appellant not entitled to a patent embodying, *inter alia,* either of the claims 4 or 5. The judgment of the District Court was rendered pursuant to proceedings instituted in said Court (Appellant's App. 1) under the provisions of R. S. 4915 (35 U. S. C. Sec. 63, 44 Stat. 1336). The proceedings in the District Court followed a final refusal of the Commissioner of Patents (Appellant's App. 86) to grant a patent on an application (Appellant's App. 56) including, *inter alia,* claims 4 and 5, which application was filed in accordance with the provisions of Sec. 4886 R. S. (U. S. C. Tit. 35, Sec. 31.)

Statement of the Case.

Appellant filed an application November 6, 1936 for a Brick Kiln and the present application (Appellant's App. 56 to 81) filed March 22, 1939, is a continuation in part of said prior application. The Primary Examiner allowed claims 1, 6 to 8, 13, 15, 20 and 22 to 25 (Appellant's App. 81) (claim 25 was awarded to Appellant by concession of priority in an interference proceeding). An appeal to the Board of Appeals, an additional claim, claim 3, was allowed (Appellant's App. 86 to 90 inclusive). From the Board of Appeals' affirmance of the Primary Examiner's rejection of claims 2 to 5, 9, 11 and 21, a Complaint for Issuance of Letters Patent, including said claims, was filed in the District Court (Appellant's App. 1 to 3). The District Court reversed the decision of the Board of Appeals as to claims 2 and 11 and affirmed it as to the remaining claims (Appellant's App. 5 to 13 inclusive). From the decision of the District Court, the present appeal has been prosecuted as to claims 4 and 5.

The invention consists of a circular kiln 27 in the center of which a ware forming unit 26 is rotably mounted on a turn table, clay being fed to the unit by a belt 25. The formed ware is transported from the unit 26 to the floor of the kiln by a conveyer 28. The conveyer 28 is rotable in unison with the unit 26 and is movable from one chamber to another as well as from one part of the kiln to another. The perforate kiln floor 29 is continuous and has hoods 41 arched thereover, the hoods being movable on tracks 43. The floor of the kiln is divided into a plurality of successive chambers, by radially formed partitions 40. The margins of the partitions are periodically engaged by seals 52 and 53 carried by the hoods.

In practice, the formed ware is conveyed to the setting and drying chamber designated S-D, as shown in Fig. 1 of the drawings. This ware is manually tiered in one part of this chamber and the conveyer 23, as above stated, progressively moved to other parts of the chamber until the brick have been completely tiered in the latter, following which the conveyer is retracted and one of the hoods 41 arranged over the tiered brick. Suction apparatus 68 is then brought into play to draw the heat from the cooling chamber C, located in Fig. 1 of the drawing at the right side of this Figure. It will be noted that the arrows lead from the duct beneath said chamber C into the flue or conduit 32 and forced through the openings in the bottom of the S-D chamber upwardly through the tiered brick. In this way the brick are first exposed to the heat gases of the lowest intensity. After completion of this cycle of operation, the hood is moved from over the S-D chamber and the next adjacent hood is brought into use over the original S-D chamber. This chamber then becomes the preheating chamber designated P in the drawing and heat is again forced through the tiered brick in the preheating chamber, but in this instance, the heat is drawn thrown the bottom of the firing chamber (located to the left of the preheating chamber in Fig. 1) into the conduit 32. The heat is then forced into the duct beneath the preheating chamber and upwardly through the brick tiered in the latter, and passed therefrom into the atmosphere. The course of the heat from the firing chamber through the conduit and into the heating chamber is designated by arrows. After the preheating cycle is completed, the firing hood is moved over the preheated brick. The firing hood is provided with firing openings 45 through which the fire passes over the top of the tiered brick and is drawn downwardly, under influence of the suction means 68, into the flue 32 for passage into the preheating chamber in a manner already described. Following the firing operation, the next hood is moved over the tiered brick, which have now been burned. This constitutes the cooling chamber designated C in the drawing. The heat and gases from the cooling chamber are drawn through perforations in the floor into the conduit 32 for a use already set out herein.

At intervals throughout the conduit or flue 32, I employ dampers 67 and also dampers 34 in the ducts 30. In this way a flexible system for transferring heat from one chamber to another is provided, the transfer being at all times within the complete control of the operator. It is of course to be understood that the above described *modus operandi* is one preferred use of the invention which has been found to obtain good results. The *movable* hoods 41, circular and continuous kiln floor 29 are obviously of the essence of importance since these permit all operations on the formed ware to take place in one chamber until the brick is ready for commercial use.

Claims Allowed by the Primary Examiner, Board of Appeals and District Court.

> 1. A kiln for use in the manufacture of brick and other clay products including a kiln floor divided into a plurality of brick treating zones each of which is provided with openings for heat induction, hoods arranged in batteries, each battery being engageable over a series of adjacent zones, the ends of the hoods being closed to provide chambers for the brick tiered on the kiln floor in said zones, firing means included in

one chamber for each battery, and means for circuiting the heat from said firing chamber to the heat induction openings in the floor of another battery of chambers.

2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.

3. In combination with an annular multi-part kiln floor provided with heat passageways, an annular heat conducting flue centrally of said kiln communicating with the kiln floor passageways, and controllable means in said flue arranged for intercircuiting of heat between said multi-part floor and flue.

6. A brick kiln including a continuous kiln floor, partitions arranged at intervals on said floor, hoods movably mounted on opposite sides of the floor, arched over the floor and partitions and engageable with the latter.

7. A brick kiln including a continuous kiln floor, partitions arranged at intervals on said floor, hoods arched over the floor and partitions, and movable on the floor for optional positioning over the partitions.

8. A brick kiln including a floor equipped with partitions, hoods mounted on the floor and movable thereover, and seals mounted in the hoods and movable into engagement with said partitions.

11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

13. A brick kiln comprising a floor, walls arranged at intervals on the floor, hoods movably mounted on said floor, the hoods including means operable into engagement with the free margins of the walls to form seals.

15. A method of making brick which consists in connecting chambers in series and tiering green ware on the floors of the chambers, impinging upon the ware in one chamber of the series from the top thereof a heating medium, withdrawing the latter through the bottom of the chamber and then transferring the heating medium to an adjacent chamber and impinging it against the ware of the latter chamber through its floor.

20. A kiln for use in the manufacture of brick including a continuous circular floor, walls arranged at intervals on the floor, a rail mounted in the floor on each side of the walls, hoods arched over the floor and walls and engaged with said rails to permit selective engagement of the hoods with the walls.

22. A brick kiln including an annular perforate kiln floor, transversely extending partitions spaced at intervals along said floor, hoods arranged to move over the floor and engageable with said partitions whereby to provide the side walls and tops of chambers, certain of said hoods having openings near their crowns for passage of heat therethrough for impingement with ware tiered on the kiln floor perforations, suction means mounted in communication with said flue and operable to draw the heat through the ware and through the floor perforations into the flue, dampers positioned at predetermined intervals in said flue to control heat transfer from one chamber to another.

23. A brick kiln comprising an annular floor, transversely extending partition walls dividing said floor into a plurality of partially formed chambers, a continuous track at each side, of said floor, an arched hood movably supported on said tracks and provided with means to effect controlled heating of said kiln, and means extending along said track arranged to cooperate with said hood in any position on said tracks to seal said chamber.

24. A brick kiln comprising an annular floor, transversely extending partition walls dividing said floor

into a plurality of partially formed chambers, a continuous track at each side of said floor, an arched hood movably supported on said tracks carrying means for selectively sealing it to said walls to form chambers, means to effect controlled heating of said kiln, means including a continuous trough filled with fluent material and extending along said track, and a blade carried by said hood to cooperate with said material for continuously sealing said chambers, with the hood in any position on said tracks.

25. A brick manufacturing plant comprising a plurality of stations including brick supporting floors and flue structures interconnecting said floors for handling the kiln gases whereby said stations are correlated to provide a system for a predetermined method of brick manufacture, said stations being designed to receive covers for selectively covering said stations for heat treating and burning, said brick, portable covers, each of which comprises wall sections, a top and means to facilitate movement of said covers from a position covering uncovered brick loaded at another station, each cover cooperating with one of said stations when in position at one of said stations to provide a kiln in which brick may be subjected to heat treatment and burning.

Claims Here on Appeal.

4. A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.

5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

Statement of Points.

1. The District Court was in error in agreeing with the Patent Office on the rejection of claims 4 and 5 on the U. S. patent to Fiske and the Swiss patent.

2. The District Court erred in rejecting claims 4 and 5 on the Fiske patent simply because the latter "discloses a movable top wall over kiln chambers positioned within an excavation in the ground arranged for the continuous operation" (Appellant's App. 11).

3. The District Court erred in rejecting claims 4 and 5 on the Swiss patent simply because the latter "discloses a movable structure combining tops and sides which is a hood" (Appellant's App. 11).

4. The District Court erred in not holding that since the prior art failed to show the *combination* or *entity* of a circular multi-part kiln floor with hoods mounted on the floor and arched over the latter, the hoods being movable for selective positioning over the floor parts, claim 4 should have been allowed.

5. The District Court erred in not holding that since the prior art failed to show the *combination* or *entity* of a continuous kiln floor with hoods arched over a portion of said floor and movable for positioning over the latter, claim 5 should have been allowed.

Summary of Argument.

Appellant has continuously urged the allowance of both of the claims here at issue, claims 4 and 5, since the filing of the application, March 22, 1939.

Both of these claims go to the very essence of Appellant's invention to-wit: A circular multi-part kiln floor or a continuous kiln floor with hoods mounted on the floor or arched over a portion of the floor, the hoods being movable for positioning over the floor; claim 4 including the additional limitation that the hoods are movable for selective positioning.

The patent to Fiske does not show hoods mounted on the kiln floor; the patent to Fiske does not show hoods arched over the kiln floor or arched over a portion of the floor; the patent to Fiske does not show hoods movable for positioning over the kiln floor; and the patent to Fiske does not show hoods movable for selective positioning over the floor parts.

The Swiss patent does not show a circular multipart kiln floor; the Swiss patent does not show hoods mounted on a kiln floor and arched over the latter; the Swiss patent does not show hoods movable for selective positioning over the floor part; the Swiss patent does not show a continuous kiln floor; and the Swiss patent does not show hoods arched over a portion of said kiln floor and movable for positioning over the latter.

Neither the patent to Fiske or the Swiss patent show the *entity* called for in claims 4 and 5 and the Court should have considered this *entity* when applying the Fiske patent and the Swiss patent to the claims.

The Swiss patent is a mere prophesy of what might be done.

The Fiske patent is an obsolete outmoded kiln not applicable, for use in present day brick manufacture, and is not pertinent to the issue here involved.

Appellant's invention is commercially successful.

Appellant's invention has received national and international recognition.

Every tribunal acting on this application regarded the invention as a definite advance in the art. Ten claims were allowed by the Primary Examiner, one claim by the Examiner of Interferences, one claim by the Board of Appeals and two claims by the District Court.

For the adequate protection of this invention, claims should be allowed which do not include partitions.

No claims have been allowed on the entity or combination of a continuous or circular kiln floor with hoods arched over the floor and movable for positioning over the floor in accordance with the teaching of this invention.

The patents to Guthrie, Kleymeyer and Knacker have not been specifically applied to the claims here at issue by the Patent Office or the District Court (Appellant's App. 83).

Argument.

The Appellant herein has been continuously engaged in ceramics since 1922 or 1923 (Appellant's App. 31) and in 1936 filed his first application for patent on substantially the same invention as that embodied in the application here on appeal (Appellant's App. 31).

A kiln made in accordance with the teaching of the present invention was erected by Appellant's licensee after Appellant received assurances from two outstanding structural clay plant and ceramic engineers in the United States,

> "that the plant could be built and made to run successfully" (Appellant's App. 23 and 24).

This kiln cost approximately $250,000 to build, is located on the Washington-Baltimore Boulevard and has been in continuous operation since its completion, several years ago (Appellant's App. 24). The estimated maximum capacity of the kiln at the time of its completion, was approximately 72,000 brick per day with 18 men operating the plant (Appellant's App. 25 and 26). This capacity was greatly exceeded.

> "Q. What have you found to be the maximum per diem capacity of the plant?
>
> A. 96,000 brick per day.
>
> Q. Have you actually manufactured 96,000 brick in one day in that plant?
>
> A. Yes, sir.
>
> Q. With how many men, approximately?
>
> A. Seventeen men.
>
> Q. How does that compare with other brick plants within the realm of your knowledge?
>
> A. I don't know of any brick plant in this country that can produce as many brick per day with that number of men.
>
> Q. Did you make any effort at the time this plant was in construction or prior thereto to determine the relative merits of this plant—that is, the Clark kiln—and some other standard brick making plant—any other standard brick making plant?
>
> A. Yes, we had occasion to make comparisons, because part of our business is the purchasing and handling of brick from out of town. We have had occasion to be around many brick plants, and we know the number of men they use to produce brick per day. Ours is exceptionally low.
>
> Before we manufactured this plant, we had a sketch made of the number of men that were used on our old plant and also the number of men that would be necessary to run the new plant. We had one of the men in our organization draw up a sketch." (Appellant's App. 24, 25 and 91.)

This Appellant is the pioneer in the use of a continuous or circular kiln with hoods arched over the kiln floor and movable on the latter. This combination or entity effects continuous brick manufacture (Appellant's App. 32 to 35). The partitions arranged at intervals on the kiln floor are not essential to the operation of the kiln.

> "Q. How are these chambers separated one from the other? For instance, you have your setting and drying and your pre-heating and firing. How are they separated?
>
> A. They are separated by a partition wall.

> Q. Is this it, shown in Figure 18 (indicating)?
>
> A. Yes.
>
> Q. Is it essential that partitions be employed?
>
> A. No, I would not say it is absolutely essential. You could form partitions with the green ware itself or with the ware.
>
> Q. And thereby eliminate partitions altogether?
>
> A. Yes, you could eliminate them altogether; in fact, at one time we figured on doing it. We have not got around to doing it yet." (Appellant's App. 35.)
>
> *Smith v. Snow,* 294 U. S. 1.
>
> "We may take it that, as the statute requires, the specifications just detailed show a way of using the inventor's method, and that he conceived that particular way described was the best one. But he is not confined to that particular mode of use since the claims of the patent, not its specifications, measure the invention. Paper Bag Patent Case, 210 U. S. 405, 419; McCarty v. Lehigh Valley R. Co., 160 U. S. 110, 116; Winans v. Denmead, 15 How. 330, 343. While the claims of a patent may incorporate the specifications or drawings by reference, see Snow v. Lake Shore R. Co., 121 U. S. 617, 630, and thus limit the patent to the form described in the specifications, it is not necessary to embrace in the claims or describe in the specifications all possible forms in which the claimed principle may be reduced to practice. It is enough that the principle claimed is exemplified by the written description of it and of the manner of using it 'in such full, clear, concise, and exact terms' as will enable one 'skilled in the art to make, construct, compound and use the same.' "

An investigation of brick plants in various parts of the United States revealed that none of them used movable hoods (Appellant's App. 36).

The plant has received unsolicited publicity (Appellant's App. 26, 27, 28, 92, 93, 94). Ceramic engineers and clay manufacturers all over this country and from several foreign countries have unsolicitedly inspected Appellant's invention at Muirkirk.

> "Q. Has any other unusual recognition been given to this plant, within the realm of your knowledge?
>
> A. Yes. As a result of the construction of this plant, we have had ceramic engineers and clay manufacturers from not only all over this country but we have had three from Australia, one from Holland, three from South Africa, one from Peru, and one from Equador that have been to this country to inspect our plan." (Appellant's App. 28.)

One of the foreign engineers, Mr. Garlick, superintendent of a plant in South Africa, wrote an article about this novel kiln or plant, part of which was read into the record in the District Court (Appellant's App. 28, 29 and 30). In part, Mr. Garlick states:

> "I had heard about this novel plant from time to time on my way East; now I was here to see it for myself". (Appellant's App. 29.)

Specific reference is made in this article to the *continuous* operation of the kiln and to the hoods movable over the kiln floor.

This invention not only falls in the commercially successful category, but because of its novelty and usefulness, has attracted attention of competitors all over the United States and in many foreign countries.

The Appellant has made a valuable contribution to the art, recognized by every tribunal which has acted on the case, the aggregate claims allowed by the tribunals of the Patent Office and the lower Court now numbering fourteen.

Raytheon Manufacturing Company v. Coe, Com'r Pats., 68 U. S. App. D. C. 255, 96 F(2d) 527; 37 USPQ 112

> "That Smith has made a real contribution of the art is, we think, plain. The allowance of nine claims is evidence of that."

The simultaneous employment of a plurality of hoods over tiered ware mounted on a circular or continuous kiln floor for definite heat treatments, and the mobility of the hoods over the kiln floor is of the essence of importance and the crux of the present invention. The novelty of the invention and the reason for its success lies in the employment of this combination.

The only references relied upon by the Examiner, by the Board of Appeals and by the District Court, against claims 4 and 5 are the U. S. Patent to Fiske and the Swiss patent.

Prior Art—Fiske Patent.

The District Court, in applying the patent to Fiske, states:

> "Fiske discloses a movable top wall over kiln chambers positioned within an excavation in the ground arranged for the continuous principle of operation. I see no patentable difference whether the movable wall is a flat top or possibly, what the plaintiff terms, a hood." (Appellant's App. 11.)

The Primary Examiner interprets Fiske as follows:

> "The Fiske patent discloses a battery of kiln chambers which are below floor level which (chambers) are covered by a portable kiln crown. cf. Figures 3 and 4. The kiln chambers may be grouped and fired downdraft thereby making the operation continuous." (Appellant's App. 84.)

The Fiske patent does show a battery of kiln chambers located in an excavation below the floor level. Fiske's own description of Fig. 3, specifically referred to by the Examiner, is as follows:

> "I prefer to build the kilns in the earth, as shown in Fig. 3, where it will be observed that the top of the kiln chamber comes flush with the surface of the ground and the *removable* top lies normally slightly above the adjacent ground in position to be engaged by the crane, as will presently be described. (Italics added.)

The Fiske patent was in the prior art for approximately forty years before Appellant entered the field and if the change made by Appellant over the Fiske patent was one coming within the skill of the art, it is a warranted inference that the change would have been made long ago.

> *Carbide & Carbon Chemicals Corporation v. Coe,* 102 F. (2d) 236; 69 U. S. App. D. C. 372
>
> "For mere skill of the art would normally have been called into action by the generally known want." Paramount Publix Corp. v. American Tri-Ergon Corp., 294 U. S. 464, 474, 55 S. Ct. 449, 79 L. Ed. 997, 1935. See also United Shoe Machinery Corp. v. E. H. Ferree Co., 64 F. (2d) 101, 103, 2 Cir. 1933, where the court said: "One of the safe tests of patentability is to inquire as to the condition of the art and the call for improvement."

To the same effect see:

> *Levin v. Coe,* 132 F. (2d) 589; 76 U. S. App. D. C. 347; 55 USPQ 224.

In view of the advance in the art, recognized by experts in this country and abroad, of Appellant's invention, the improvements made by him should certainly be construed to arise to the dignity of invention. Claim 4 of this appeal calls for a circular multi-part kiln floor. Even if it is accepted that the patent to Fiske shows this part of the claim, Fiske cannot be construed to show hoods mounted *on said floor.* In other words, in referring to the structure of Fiske, shown in Fig. 3, to which the Examiner has specifically referred, the multi-part kiln floor would be the bottom of the pit or excavation. Certainly the removable top (a10) even if it could be construed to be a hood, cannot be said to be mounted *on said floor.* The removable top (a10) is shown to be mounted on the surface of the ground spanning the pit or excavation. Additionally, Fiske cannot be construed to show "said hoods being movable for selective positioning over the floor parts, as called for in claim 4. Here again, the floor parts obviously refer to the kiln floor and the removable top (a10) certainly does not anticipate this part of the Appellant's claim entity by any reasonable interpretation of the structure of Fiske. Fiske tops (a10) are removable by means of a crane and are then transported on a superposed track assembly. Should this cumbersome, unwieldly device be held to be the equivalent of "hoods movable for selective positioning over the floor parts"? It is obvious that the lower court did not give these differences the weight to which they are entitled, in view of the meritorious character of the invention here at issue.

Poulsen et al. v. Coe, Com'r Pats., 119 F. (2d) 188; 73 U. S. App. D. C. 324; 48 USPQ 673

> "We think moreover that the improvement made by the appellants, simple though it may seem from the point of view of hind sight, was inventive in character. As said by Judge Learned Hand in Van Heusen Products v. Earl & Wilson, 300 F. 922, 929 (S. D. N. Y.; 1924) 'Is it not clear that the quality of a man's inventiveness must be tested by reconstituting the situation as it was in the light of the preceding history of the art?' "

The Swiss Patent.

The District Court, in applying the Swiss patent states that:

> "it clearly discloses a movable structure combining tops and sides which is a hood."

Appellant's claim calls for more than a hood, but the Court has made no attempt to specifically apply the Swiss patent to either claim 4 or 5. The Swiss patent shows a so-called kiln body 5 which, in Fig. 3, includes opposite doors 6 formed in two parallel walls, the kiln being movable over rails presumably to permit shifting of the so-called kiln body from one of the stationary hearths to the other. In no sense of the word can the Swiss patent be construed to show a circular multi-part kiln floor, as called for in claim 4 or a continuous kiln floor, as called for in claim 5. Additionally, the Swiss patent cannot be construed to show hoods mounted on said (kiln) floor and arched over the latter, as called for in claim 4 or hoods arched over a portion of said (kiln) floor, as called for in claim 5. The tops of the hearths 1 and 2 constitute the kiln floors and the so-called kiln body 5 is mounted on tracks placed in the ground which carries the hearths 1 and 2. The hoods are not movable for selective positioning over the floor parts, as called for in claim 4, because the Swiss patent employs only one hood which is shifted back and forth from one hearth to the other and it is not believed proper to interpret this as being "hoods—movable for selective positioning over the floor parts". The selectivity of the Appellant's hoods, is described in detail in the specification

> *Raytheon Manufacturing Company of Newton, Massachusetts, et al., v. Coe, Com'r Pats.,* 96 F. (2d) 527; 68 U. S. App. D. C. 255 37 USPQ 112
>
> "it should be kept in mind *that claims are interpreted with reference to the specification and drawing.*" (Italic added.)

Furthermore, it is submitted that the Swiss patent does not show "hoods arched over a portion of said floor and movable for positioning over the latter" as called for in claim 5. It must be borne in mind that the Swiss patent uses only *one kiln body,* movable back and forth over two hearths. Appellant, as set out in claim 5, uses *hoods* which hoods are arched over a portion of the floor in order to effect continuous operation of the kiln.

With further reference to the Swiss patent, it is submitted that this should be completely negatived, as a reference, because it does not set forth anything that has been done but is a mere prophesy of what might be done (Appellant's App. 96). The specification of said patent includes such statements as the following:

> "It might, perhaps, be advantageous to charge these furnaces—If this were done there would be an evident gain from the fact that the car might be charged, etc. * * * The present invention takes from the above mentioned propositions the good parts and avoids the disadvantages."

Becket v. Coe, Com'r Pats., 69 U. S. App. D. C. 51; 98 F. (2d) 332; 38 USPQ 26

> "Foreign patents are valid references when there is clear disclosure of invention sought to be patented in United States, but when such patent merely prophesies what can be done without setting forth that it has been done, or makes claims for things not fairly disclosed in specification, foreign patent does not anticipate.

Baldwin-Southwark Corporation et al. v. Coe, Com'r Pats. (76 U. S. App. D. C. 412) 133 F. (2d) 359; 55 USPQ 398

> "It is not competent to read into a foreign publication any information which it does not afford on its face. Badische Anilin & Soca Fabrik v. Kale, 94 F. 163 (C. C. S. D. N. Y. 1899) affirmed 104 F. 802 (1900); Loew Filter Co. v. German American Filter Co. 164 F. 855 (C. C. A. 6th, 1908); Carson v. American Smelting and Refining Co., 4 F. (2d) 463 (C. C. A. 9th 1925), certiorari denied, 269 U. S. 555 (1925). The disclosure of a foreign publication must be so clear that it teaches the subject matter of the patent in suit without assistance from the latter. Wisconsin Alumni R. Foundation v. Breon & Co., 8 F. (2d) 166 30 USPQ 242; CCA 8th, 1936, certiorari denied, 299 U. S. 598 (1936). Moreover, as was held in Atlantic Gulf & Pacific Co. v. Woods, 288 F. 148, 155 (C. C. A. 5th, 1923), quoting from Cimiotti Uphairing Co. 115 F. 524 (C. C. S. D. N. Y. 1902) a case itself based upon Seymour v. Osborne,
>
> > 'A (foreign) document so obscure in its terminology that two conflicting theories may be deduced therefrom and supported by equally plausible arguments is too indefinite to be utilized as an anticipation'

> These principles, although applied by the courts referred to in infringement suits, *are equally applicable to proceedings to obtain a patent. Beckett vs. Coe,* 69 App. D. C. 51, 98 F. (2d) 332 (38 USPQ 26 (1938)). That is to say, a foreign publication cannot operate to anticipate a claimed invention unless it meets these principles (Italics added).

Davis v. Coe, 64 U. S. App. D. C. 345, 83 F. (2d) 602

> "The disclosure of a foreign patent is to be measured not by what may be made out of it, but what is clearly and definitely expressed by it. (In *re.* Ek, 57 App. D. C. 203, 19 F. (2d) 677; Carson v. American Smelting & Refining Co., 4 F. (2d) 463."

* * * * *

The remaining prior art has not been applied to either of the claims here at issue by the Patent Office or the District Court and specific reference thereto is not believed necessary in the present brief.

Poulsen et al. v. Coe, Com'r Pats., 119 F. (2d) 188; 73 U. S. App. D. C. 324; 48 USPQ 673

* * * * *

Appellant's Combination.

The two claims here at issue are directed to patentable combination since the combination or entity of a continuous kiln floor, with hoods mounted on the floor and movable for positioning over the latter, is not shown in the prior art.

Leeds & Catlin v. Victor Talk. Mach. Co., 213 U. S. 301

> A combination is a union of elements, which may be partly old and partly new, or wholly old or wholly new, but whether new or old, the combination is a means—an invention—distinct from them. They, if new, may be inventions and the proper subject of patents, or they

may be covered by claims in the same patent with the combination.

> *Electrons Inc., et al. v. Coe, Com'r Pats.*, 99 F. (2d) 414; 69 U. S. App. D. C. 181; 38 USPQ 370

> "The general principles applicable to the question whether invention exists in a combination of elements are briefly: The fact that all the elements entering into a combination are old does not necessarily negative the existence of invention. Diamond Rubber Co. v. Consolidated Rubber Tire Co., 220 U. S. 428 (1911); Iron Fireman Mfg. Co. v. Industrial Engineering Corp., 89 F. (2d) 904 (33 USPQ 277) (C. C. A. 7, 1937). Such a combination may be patentable invention if it produces a new result, or an old result in a new or more efficient way. Independent Oil Well Cementing Co. v. Halliburton, 54 F. (2d) 900 (12 USPQ 175) (C. C. A. 10, 1932); N. O. Nelson Mfg. Co. v. F. E. Myers & Bro. Co., 25 F. (2d) 659 (C. C. A. 6, 1928); see Walker on Patents (Deller, 1937) 147-49."

* * * * *

Recent Decisions of This Court.

The more recent decisions of this Court, including

> *Abbot et al. v. Coe,* 109 F. (2d) 449, 71 U. S. App. D. C. 195;
>
> *Potts v. Coe,* 60 USPQ 226, U. S. App. D. C. Decided Jan. 18, 1944;
>
> *Special Equipment v. Coe,* 62 USPQ 12, U. S. App. D. C., Decided June 19, 1944;
>
> *Monsanto Chemical Company v. Coe,* 62 USPQ 37, U. S. App. D. C., Decided June 26, 1944;

have been considered but the principles therein annunciated and not believed to be directed at or applied to inventions of the character here at issue.

We have here a typical case of an inventor working out a new and useful device, after much experiment and in having one of the devices built at a very considerable cost by a licensee. The invention is a real advance in the art which has been in continuous use for some years and has effected phenomenal results. The only references which the Examiner was able to find against the two claims here at issue were: an obsolete U. S. patent granted forty-five years ago and a Swiss patent granted some years ago embodying only a hybrid disclosure of the invention, the alleged invention being the result of a prophetic hypothesis which the patentee apparently used as a premise.

The patent to Guthrie (Appellant's App. 99) was granted on May 20, 1879 on a circular kiln and although many patents have been granted in this art since that date, there has never been a successful embodiment of this now highly desirable type of kiln put into actual practice until the advent of the invention here at issue. In other words, there has been a gap in the art of approximately sixty years without a single advance made on the generic principle of the Guthrie patent.

The Barbed Wire Patent, 143 U. S. 275, 282-283

> "Under such circumstances courts have not been reluctant to sustain a patent to the man who has taken the final step which has turned a failure into a success. In the law of patents it is the last step that wins * * *. There are many instances in the reported decisions of this court where a monopoly has been sustained in favór of the last of a series of inventors, all of whom were groping to attain a certain result, which only the last one of the number seemed able to grasp."

Certainly this Appellant has taken the step which converted the failures of the prior art into the success of the present invention, given recognition by those skilled in the art all over this country and in many of the foreign countries. Certainly it cannot be the intention of this Court to deny adequate patent protection where a high order of invenion exists, as in the instant case. It must be remembered that the Patent Office may have granted claims 4 and 5 if the Patent Office had the benefit of the testimony of the witnesses Clark and Somerville and the exhibits filed in support of said testimony. It is not thought that this Court, in the Special Equipment case, wherein one member of the Court, concurring especially, made the observation that the implications of the decision will

> "require a considerable re-examination—if not readjustment—of the Patent Office practice and procedures, especially with respect to sub-combination claims"

intended to set up an insuperable standard of invention. No less in authority, that the eminent Justice Learned Hand in a comparatively recent case, made the timely and pertinent observation that our patent laws as constituted, are not intended as being available only to the *superlative skills.*

> *Dewey & Almy Chemical Company et al. v. Mimex Company, Inc.*, 124 F. (2d) 986; 52 USPQ 139 (C. C. A. 2)

> "It would indeed be absurd to rank the invention as a great pioneer such as come only at rare intervals and are the work of genius. Indeed, it is precisely those which probably need no patents to call them forth; the stimulus of profit has little or no part in their production. *The patent law is aimed at animating a lower order of imagination and skill than that;* more, it is true, than the ordinary rub of competition automatically brings out from competent workmen in the art, but not the *superlative skills* at least that has been its uniform avowed purpose" (Italics added).

While it is true, as also observed by the Court of Customs and Patent Appeals, in a recent decision, that the Supreme Court has in recent years shown "an increased disposition to raise the standard of originality necessary for a patent" nevertheless, it is not believed that these decisions intended that patents be available only to the *superlative skills* or to set up an insuperable standard of invention. Certainly the Court of Customs and Patent Appeals did not in said decision so interpret the Supreme Court decisions.

In Re Shortell, 142 F. (2d) 292

> "While recognizing, of course, that it is the duty of this court to follow the law as declared by the Supreme Court, we do not conceive it to be our duty to change our basis of decision merely because some courts assume that there is a 'new doctrinal trend' with regard to the standards required for invention."

The two claims on appeal are believed to be essential to afford Appellant protection commensurate with the novelty and ingenuity of this invention.

Conclusion.

1. Appellant has made a valuable contribution to the art, recognized by all tribunals of the Patent Office acting upon the application, as well as the lower Court.

2. Appellant's invention is commercially successful.

3. Appellant's invention has received recognition from engineers skilled in the art, from this country and from several foreign countries.

4. The output of Appellant's plant far exceeds the per capita output of any known plant in the world.

5. Appellant's invention is the result of his own ingenuity and industry.

6. Appellant's invention has filled a void in the art of approximately sixty years.

7. Given the most liberal interpretation, the Fiske patent does not anticipate the Appellant's entity or combination as called for in claims 4 and 5.

8. Given the most favorable interpretation, the Swiss patent does not show the entity or combination covered in claims 4 and 5, but on the contrary, the Swiss patent shows only a fragment of this combination.

9. The Swiss patent is a mere prophesy and is not entitled to consideration as a valid reference.

10. Claims should be allowed Appellant not including the limitation of the partitions.

11. It is a warranted inference that if the testimony, and exhibits herein were available to the Patent Office, claims 4 and 5 would have been allowed.

12. Claims 4 and 5 should be allowed to afford Appellant protection commensurate with the novelty of his invention.

Respectfully submitted,

BERNARD F. GARVEY,
1010 Vermont Ave., N. W.,
Washington, D. C.,
Attorney for Appellant.

JOINT APPENDIX
Case No 8776.

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1 IN THE

DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF COLUMBIA.

JOHN R. CLARK, Bethesda, Maryland,
Plaintiff,
vs.
CONWAY P. COE, Commissioner of Patents,
Washington, D. C.,
Defendant.

Civil Action No. 17,242

Complaint for Issuance of United States Letters Patent.

I. The jurisdiction of this Court depends upon the Patent Laws of the United States, this Complaint being filed under Section 4915, Revised Statutes (U. S. C. Title 38, Section 63).

II. The Plaintiff, John R. Clark on March 22, 1939 filed an application for letters patent on a Kiln For Brick And Other Clay Products, Serial Number 263,507, which application was passed upon by the Primary Examiner, who allowed claims 1, 6, 7, 8, 13, 15, 20, 22, 23, 24, and 25, and finally rejected claims 2 to 5, 9, 11, and 21, from which final rejection Plaintiff appealed to the Board of Appeals of the United States Patent Office, who affirmed the rejection of the Primary Examiner on all except claim 3, which claim was allowed.

2 III. The Board of Appeals of the United States Patent Office, in a decision rendered on the 27th day of March, 1942, refused to allow six claims of said John R. Clark application, Serial No. 263,507, to which the Plaintiff herein is entitled, which claims are as follows:

2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.

4. A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.

5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

9. A brick kiln including a floor and relatively movable hoods arched over the floor, certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.

11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

21. A brick kiln including a fixed floor with openings therein, relatively movable hoods arched over said

floor, certain of said hoods being provided with heat induction openings adjacent their crowns, whereby to permit impingement of heat with ware tiered on the kiln floor from a point above the ware, and suction means arranged to be placed in communication with any of said openings to withdraw inducted heat from the kiln through the openings in the floor of the latter.

3 IV. The Defendant, Conway P. Coe, Commissioner of Patents of the United States, by the aforesaid decision of the Board of Appeals of the United States Patent Office, has refused and still refuses to grant Letters Patent of the United States to the Plaintiff on claims 2, 4, 5, 9, 11 and 21.

V. No appeal has been taken from said decision of the Board of Appeals to the Court of Customs and Patent Appeals, and no such appeal is pending or has been decided.

WHEREFORE, the Plaintiff prays that this Honorable Court authorize the Commissioner of Patents to issue to Plaintiff, Letters Patent of the United States embodying said claims 2, 4, 5, 9, 11 and 21, upon compliance with the requirement of the law in such cases made and provided.

JOHN R. CLARK,
By BERNARD F. GARVEY,
Attorney for Plaintiff,
1010 Vermont Ave., N. W.,
Washington, D. C.

---

4 **Answer to the Complaint.**

To the Honorable the Justices of the District Court of the United States for the District of Columbia.

I, II. Defendant admits the allegations of paragraphs I and II.

III. He admits that the Board of Appeals of the Patent Office in a decision rendered on March 27, 1942, refused to allow claims 2, 4, 5, 9, 11 and 21 of the patent application of John R. Clark, Serial No. 263,507, entitled Kiln for Brick and Other Clay Products. He admits that said claims are as set out in paragraph III. He denies that plaintiff is entitled to the issuance of a patent containing any of said claims as it is deemed that they are unpatentable in view of the following prior patents and for the reasons given in the statement of the examiner in answer to the appeal and the decision of the Board of Appeals, copies of which will be furnished at the trial:

Guthrie,	215,606,	May	20,	1879,
Knacker,	511,704,	Dec.	26,	1893,
Fiske,	633,955,	Sept.	26,	1899,
Kleymeyer,	1,913,599,	June	13,	1933,
Swiss Patent,	162,939,	July	31,	1933.

Profert of copies of these patents is hereby made.

IV, V. He admits the allegations of paragraphs IV and V.

W. W. COCHRAN,
Solicitor, U. S. Patent Office,
Attorney for Defendant.

October 17, 1942.

I hereby certify that a copy of this Answer to the Complaint was mailed today, October 17, 1942, to the attorney for plaintiff, Mr. Bernard F. Garvey, 1010 Vermont Ave., N. W., Washington, D. C.

W. W. COCHRAN,
Solicitor.

Decision of District Court.

6 The plaintiff seeks an order from this Court authorizing the Commissioner of Patents to issue to him a patent containing the following claims:

2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.

4. A brick kiln including a circular multipart kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.

5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

9. A brick kiln including a floor and relatively movable hoods arched over the floor certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.

11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

7 21. A brick kiln including a fixed floor with openings therein, relatively movable hoods arched over said floor, certain of said hoods being provided with heat induction openings adjacent their crowns, whereby to permit impingement of heat with ware tiered on the kiln floor from a point above the ware, and suction means arranged to be placed in communication with any of said openings to withdraw inducted heat from the kiln through the openings in the floor of the latter.

These claims relate to a brick-making plant. They provide for a brick-firing kiln of a continuous type comprising an annular arrangement of a series of compartments separated from each other by fixed radial partitions. A hood structure is provided covering at least one section and usually including three sections a setting, a firing, and a cooling section. This hood structure is movable progressively around the annulus. The ware, after being wire-cut, is conveyed from a center equipment mounted on a turn table to the various kiln sections, and as the turn table is rotated the setting operation is moved from section to section. The burning is accomplished by introduction of the flame from oil burners near the top of the burning hood section in the downdraft system. The products of combustion are conducted through the floor of this section and under the perforate floor of the water-smoking and preheating chamber.

The defendant relies on the following patents:

Guthrie	215,606	May 20, 1879
Knacker	511,704	Dec. 26, 1893
Fiske	633,955	Sep. 26, 1899
Kleymeyer	1,913,599	June 13, 1933
Swiss Patent	162,939	July 31, 1933

The Guthrie patent discloses a plant layout comprising a fixed annular kiln at the center of which from a molding machine mounted on a rotary turn table ware is conveyed to the kiln chamber being set. The general plan of a brickmaking plant of plaintiff's type, including annular arrangement of firing compartments, a brick machine mounted upon a turn table at the center of the annulus with clay feeding and brick conveying means equivalent generally to plaintiff's plant is shown by Guthrie.

8 The Fiske patent discloses a series of kiln chambers covered by a portable kiln crown. They may be grouped and fired down-draft.

The Kleymeyer patent shows a grouping of round downdraft periodic kilns with a flue system for continuous operation.

The Knacker patent shows an annular kiln adapted for continuous operation in which the firing zone moves around the circle of the kiln. The fuel burners are located in the crown of the kiln and the heat impinges directly on the ware as it moves downwardly through the ware.

The Swiss patent discloses a method of firing ware in which a portable hood is moved over the ware and application of heat is applied to the latter.

The Patent Office rejected Claim 2 as not different patentably from Guthrie. Claim 2 requires that the kiln section of the plant comprises of a plurality of hoods differing in this respect from the Guthrie structure in that Guthrie annular kiln is built of fixed structure rather than movable parts such as disclosed by applicant. I think that taking into consideration the whole structure, applicant's improvement amounts to invention and he is entitled to a patent comprising this claim.

Claims 4 and 5 were rejected by the Patent Office as being met by either Fiske or the Swiss patent. Fiske discloses a movable top wall over kiln chambers positioned within an excavation in the ground arranged for the continuous principle of operation. I see no patentable difference whether the movable wall is a flat top or possibly, what the plaintiff terms, a hood. The Swiss patent clearly discloses a movable structure combining tops and sides which is a hood. I agree with the Patent Office in rejecting Claims 4 and 5.

9 As to claims 9 and 21 which require heat-inductor openings to be provided near the tops of the hood for the purpose of furnishing heat to fire the brick, and in Claim 21 that draft openings be provided in the bottom of the floor of the kiln for the escape of products of combustion, this is clearly shown in the patent to Knacker. I agree also with the Patent Office in rejecting these claims.

As to Claim 11, I do not think it is met by any of the references cited by the Patent Office and am of the opinion that the plaintiff is entitled to this claim.

JENNINGS BAILEY,
Justice.

10 **Findings of Fact.**

1. This is an action under Section 4915 R. S. (U. S. C., title 35, sec. 63), in which Plaintiff seeks a judgment which would authorize Defendant to issue to Plaintiff a patent containing claims 2, 4, 5, 9, 11 and 21.

2. These claims relate to a brick-making plant. They provide for a brick-firing kiln of a continuous type comprising an annular arrangement of a series of compartments separated from each other by fixed radial partitions. A hood structure is provided covering at least one section

and usually including three sections a setting, a firing, and a cooling section. This hood structure is movable progressively around the annulus. The ware, after being wire-cut, is conveyed from a center equipment mounted on a turn table to the various kiln sections, and as the turn table is rotated the setting operation is moved from section to section. The burning is accomplished by introduction of the flame from oil burners near the top of the burning hood section in the downdraft system. The products of combustion are conducted through the floor of this section and under the perforate floor of the water-smoking and preheating chamber.

11 3. The Defendant relies on the following patents:

Guthrie	215,606	May 20, 1879
Knacker	511,704	Dec. 26, 1893
Fiske	633,955	Sep. 26, 1899
Kleymeyer	1,913,599	June 13, 1933
Swiss Patent	162,937	Sept. 16, 1933

4. The Guthrie patent discloses a plant layout comprising a fixed annular kiln at the center of which, from a molding machine mounted on a rotary turn table, ware is conveyed to the kiln chamber being set. The general plan of a brick-making plant of plaintiff's type, including annular arrangement of firing compartments, a brick machine mounted upon a turn table at the center of the annulus with clay feeding and brick conveying means equivalent generally to plaintiff's plant is shown by Guthrie.

5. The Fiske patent discloses a series of kiln chambers covered by a portable kiln crown. They may be grouped and fired down draft.

6. The Kleymeyer patent shows a grouping of round down draft periodic kilns with a flue system for continuous operation.

7. The Knacker patent shows an annular kiln adapted for continuous operation in which the firing zone moves around the circle of the kiln. The fuel burners are located in the crown of the kiln and the heat impinges directly on the ware as it moves downwardly through the ware.

8. The Swiss patent discloses a method of firing ware in which a portable hood is moved over the ware and application of heat is applied to the latter.

9. Claim 2 reads as follows:

> A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.

12 10. The Patent Office rejected Claim 2 as not different, patentably, from Guthrie. Claim 2 requires that the kiln section of the plant comprise a plurality of hoods differing in this respect from the Guthrie structure in that Guthrie's annular kiln is built of fixed structure rather than movable parts, such as disclosed by applicant. I think that taking into consideration the whole structure, applicant's improvement amounts to invention and he is entitled to a patent comprising this claim.

11. Claims 4 and 5 read as follows:

> 4. A brick kiln including a circular multipart kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.

> 5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

12. Claims 4 and 5 were rejected by the Patent Office as being met by either Fiske or the Swiss patent. Fiske discloses a movable top wall over kiln chambers positioned within an excavation in the ground arranged for the continuous principle of operation. I see no patentable difference whether the movable wall is a flat top or possibly, what the plaintiff terms, a hood. The Swiss patent clearly discloses a movable structure combining tops and sides which is a hood. I agree with the Patent Office in rejecting Claims 4 and 5.

13. Claims 9 and 21 read as follows:

> 9. A brick kiln including a floor and relatively movable hoods arched over the floor certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.
>
> 21. A brick kiln including a fixed floor with openings therein, relatively movable hoods arched over said floor, certain of said hoods being provided with heat induction openings adjacent their crowns, whereby to permit impingement of heat with ware tiered on the kiln floor from a point above the ware, and suction means arranged to be placed in communication with any of said openings to withdraw inducted heat from the kiln through the openings in the floor of the latter.

13 14. As to claims 9 and 21 which require heat-inductor openings to be provided near the tops of the hood for the purpose of furnishing heat to fire the brick, and in Claim 21 that draft openings be provided in the bot-

tom of the floor of the kiln for the escape of products of combustion, this is clearly shown in the patent to Knacker. I agree also with the Patent Office in rejecting these claims.

15. Claim 11 reads as follows:

> 11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

16. As to Claim 11, I do not think it is met by any of the references cited by the Patent Office and am of the opinion that the plaintiff is entitled to this claim.

CONCLUSIONS OF LAW.

1. Plaintiff is entitled to the issuance of a patent containing claims 2 and 11 set out in the complaint.

2. The complaint should be dismissed as to claims 4, 5, 9 and 21.

JENNINGS BAILEY,
Justice.

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14 **Judgment.**

This action came to be heard at this term and thereupon upon consideration thereof, it is this 25th day of January, 1944,

ADJUDGED that the Commissioner of Patents is authorized to issue a patent including claims 2 and 11, upon the filing in the Patent Office of a copy of this Judgment, and otherwise complying with the requirements of the law.

It is further adjudged that the plaintiff is not entitled to a patent containing any one of the claims 4, 5, 9 or 21 and the complaint is dismissed as to these claims, with costs against the plaintiff.

JENNINGS BAILEY,
Justice.

Approved as to Form:
W. W. COCHRAN,
Attorney for Defendant.

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15 **Notice of Appeal.**

Notice is hereby given this 24th day of April, 1944, that the plaintiff, John R. Clark, hereby appeals to the United States Court of Appeals for the District of Columbia from the judgment of this Court entered on the 25th day of January, 1944, in favor of the defendant, Conway P. Coe, Commissioner of Patents, as to claims 4 and 5, against said plaintiff, John R. Clark.

BERNARD F. GARVEY,
Attorney for Plaintiff.

Transcript of Shorthand Report of Proceedings Had and Testimony Adduced December 14, 1943.

18 IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE DISTRICT OF COLUMBIA.

JOHN R. CLARK, *Plaintiff,* vs. CONWAY P. COE, Commissioner of Patents, *Defendant.*	Civil Action No. 17,242.

Washington, D. C.,

Tuesday, December 14, 1943.

Pursuant to notice theretofore given to all known interested parties, and designation theretofore made by the Assignment Commissioner, the above-entitled cause came on for hearing and trial at 11:30 o'clock a. m., on Tuesday, December 14, 1943, in the District Court of the United States for the District of Columbia, in the court house in the City of Washington,

Before: Honorable Jennings Bailey, Associate Justice of the District Court of the United States for the District of Columbia, there being

Present:

Bernard F. Garvey, Esquire, of Washington, D. C., Attorney for the Plaintiff; and

W. W. Cochran, Esquire, Solicitor for the Patent Office, by Robert F. Whitehead, Esquire, Attorney for the Defendant.

Thereupon the following proceedings and transactions were had and testimony was taken:

19 PROCEEDINGS, TRANSACTIONS AND TESTIMONY.

The Court: Are you ready, gentlemen, in the case of Clark vs. Coe?

Mr. Garvey: If the Court please, I expect my witnesses here momentarily.

The Court: You may make your opening statement.

Mr. Garvey: If the Court please, I hand you a trial brief, which I think may be helpful to you. Also at this time I should like to offer in evidence the file wrapper, believing that it may be helpful to your Honor during the opening statement.

The Court: Let it be marked.

> (Thereupon a certified copy of the file wrapper and contents in the matter of the Pending Application of John R. Clark, filed March 22, 1939, Serial No. 263,507, for Improvement in Kiln in Brick and other Clay Products, as certified by the Commissioner of Patents, was received in evidence and was marked by the Clerk of the Court "Plaintiff's Exhibit No. 1.")

OPENING STATEMENT ON BEHALF OF THE PLAINTIFF.

Mr. Garvey: If your Honor please, this invention is a machine for the manufacture of brick. One of its objects is to expedite brick manufacturing—to manufacture brick in a kiln so that the number of employees or workmen will be reduced to an absolute minimum. With the present invention it has been found that it is possible to reduce the number of men by more than one-half, and we shall present evidence to support that. With that end in view, the inventor set out to provide suitable means to bring the clay directly from the bank to the ware-forming mechanism and then to convey the ware to a kiln. Once it reaches that kiln, it never leaves there. The green ware does not leave until it is completed brick. It stays right in that identical spot until it has been completed, and then the brick is carted away. That has been made possible with the present invention.

I will describe it generally, if your Honor please, and then we can have my description supplemented by the witness in any way that may seem necessary.

If your Honor will refer to Figure 2 of the drawings, you will find a diagrammatical view of the entire plant. There we have tracks 20 which lead from the clay bank. These tracks, of course, go back at the present time maybe a half mile to the clay banks. Mounted for operation on those tracks are dump cars 22. The clay is carried from the bank on the tracks and is dumped into clay-preparing mechanism 24 which is subjacent to the dump cars in Figure 2 of the drawing.

The prepared clay then gravitates onto an endless belt 25. That belt is operatively mounted over a part of the circular kiln which forms the crux of the present invention, the circular kiln being designated 27.

If your Honor will now refer to Figure 1, you will find the top plan view of the kiln and will notice the inner end of the belt 25 immediately above the ware-forming mechanism 26.

The Court: In Figure 2 it apparently goes beyond. Is 26 the circular kiln?

Mr. Garvey: 26 is the ware-forming housing, where the ware-forming mechanism is stored and operated. Does that answer your Honor's question?

21 The Court: Yes.

Mr. Garvey: Now, your Honor, the ware-forming mechanism, of course, is of standard construction. As your Honor probably knows, in mechanism of this type the prepared clay is extruded from suitable dies and is then wirecut into brick size, pursuant to which the green ware is automatically deposited on a conveyor 28, and the conveyor 28 carries the green ware in brick size to one of the chambers of the brick kiln 27.

Upon referring again to Figure 1, your Honor will note that the conveyor 28 has its outer end mounted above the floor of one of the kiln chambers, designated SD, which stands for setting and drying chamber. In other words, this is the setting and drying chamber, this being the first chamber in which the green ware is tiered. Having been tiered to any desirable height, one of the hoods forming part of this invention—and a pretty important part, too—is moved over the tiered brick.

Your Honor will observe one of these hoods at 41, which is just to the right of the letters SD.

Then the hood is moved over, as it were, the letters SD so as to cover the tiered brick. That is the first step, now, in the manufacture of the brick.

After the green ware has been set and dried for a predetermined time, it is preheated. That preheating takes place not by moving the brick at all but simply by moving the next hood, which is marked P—preheated—and the gases circulated through the bottom of the kiln floor—it is
a perforated floor—come up through there in a man-
22 ner which I shall more particularly describe in a mo-
ment. They go up through the tiered brick for the
second cycle of operation.

After that cycle has been completed, we then have the firing operation. Now, the firing is done through the hood marked F.

I will ask your Honor to refer to Figures 18 and 19, which show the firing hood. In Figure 18 and in Figure 19 your Honor will note a series of openings 45 which are arranged near the crown of the hood. These are the openings for the induction of gases which will flow in over the top of the tiered brick in the firing chamber. The little openings 46 below are simply peep openings, and the platfrom 47 is to accommodate the operator who has to stand there at the time when the kiln is in operation.

I call your Honor's attention particularly, so that it will not be confused later on, to the fact that the gases are inducted through the top of the firing kiln through the openings 45. They then pass down through the tiered brick in the firing chamber and are withdrawn by suitable suction means—suction fans—into the conduit 32. Your Honor will note that it is necessary to go back to Figure 1 for that illustration.

The Court: Yes.

Mr. Garvey: If your Honor will follow the arrows from the F chamber, you will find that the path of the gas is indicated. The gases pass from the bottom of the firing chamber into the conduit 32, thence into the pre-heating chamber, which is right next to it—just to the right of it—and then the gases go up through the pre-heating chamber.

23 After the firing has been completed, we then have the cooling operation. If your Honor will again refer to Figure 1, you will note that the cooling chamber is designated C. After the firing has been completed—in other words, after the brick have been exposed to the gases for a predetermined period of time—the firing hood is moved, and the cooling hood is brought into operation. When the cooling hood is arched over the brick being treated, the gases will be drawn by suction from the bottom of

the cooling chamber through the duct 31 into the conduit 32, and then the gases follow the path indicated by the arrows in Figure 1.

Does your Honor follow that in the drawing?

The Court: Yes.

Mr. Garvey: So you see the cooling gases go through the conduit in the path shown by the arrows. You can take either side of the drawing. On this side you come down into the setting and drying chamber. In other words, the gases go from the cooling chamber to the setting and drying chamber, and the gases go from the firing chamber to the pre-heating chamber. This is what is known as a battery. In other words, these four kilns constitute a battery. You first set the green ware up on the floor of your first chamber, which is the setting and drying chamber. After that cycle of operation has been completed and the next brick brought into position, you have your pre-heating hood. Then you bring your firing hood into operation, and finally your cooling hood.

During all that period of time the brick are being subjected to a certain treatment—a certain heat treatment.

Then, at the expiration of the cooling period, the
24 hood is removed and the trucks may back right into
the kiln, load the brick, and carry it away. So as I said in the beginning, the brick are not touched; they are not moved from the time they are tiered on the setting and drying floor until they have been completely manufactured.

If the Court please, you will notice that there are a lot of details in this case that I am not going into because they form no part of the present issue. I am dealing only with such part as I think is essential to the Court in order to understand the issues here involved. The main thing we have here is this movable hood. That is the crux of the whole invention, because the Solicitor will introduce art showing, for instance, a circular kiln where the arch is made integral and the base of it is sunk into the ground; but there is no mobility whatsoever to the arch. In other words, it is necessary to move the brick around, just as is done in many other kinds of kilns. It is not possible to put them in one place as green ware and bring them out as commercial brick after these various cycles of operation have been completed.

Twelve claims have been allowed by the Patent Office in this case. Ten were allowed—

The Court: You are not satisfied with twelve?

Mr. Garvey: No, your Honor. I would be satisfied with two if they were the right kind. But we do not feel that we have received the protection that is warranted by the ingenuity displayed in this invention.

Ten claims were allowed by the primary examiner. One we obtained through interference. That is of no importance in this case, and I shall not go into it except to say
25 that we were awarded concession of priority. We
had one claim allowed in that way, making eleven. Then the Board of Appeals allowed us one claim. We are now here on rejected claims 2, 4, 5, 9, 11, and 21. Claims 2, 9, 11, and 21 are directed to what we urge is novel combination. Claims 4 and 5 are directed to the genus of the invention and are, of course, the claims that we are most anxious to obtain. Both of these claims pertain, somewhat broadly, it is true, to the movable hood, but also in each instance we include the continuous kiln or the circular kiln and the selectivity of the hoods, so that they can be moved, as has already been indicated. But I should like to call your Honor's attention to the fact that these hoods are all alike, except the firing hood. In other words, the setting and drying hood, the preheater, and the cooler are just exactly the same; therefore, the cooling hood can be used for set-

ting and drying, the setting and drying hood can be used for cooling, and the same is true of the preheating hood. But the firing hood is the one which I called your attention to in Figures 18 and 19. That is of special construction, because the gases have to be introduced through the top.

So much for the invention and the application as filed. This application is a continuation in part of another application. That application was filed in 1936, and there were some claims allowed in it. Mr. Clark here is the inventor, and he filed that application.

Later on it seemed to possess some merit, and he took the matter up with Mr. Somerville here, of the Washington Brick Company. He became interested and consulted experts about it, and they decided to build a kiln. 26

This kiln has been constructed at Muirkirk, Maryland. Your Honor may have seen it, because there is a big sign reading "Washington Brick Company" that is visible from the Washington-Baltimore Boulevard, on the east side of the Boulevard, at Muirkirk.

This kiln has been constructed out there at an expense of approximately $250,000. In fact, considering the appurtenances necessary to go with the plant, the experimentation, and so forth, you can easily enough add another $100,000 to that. So $350,000 is somewhere near the approximate investment in this kiln.

What has been the result? What results have been obtained from this kiln? First of all—and these are actual figures which they are prepared to furnish your Honor—less than half the number of workmen are employed to turn out a comparable number of brick in a shorter period of time. In other words, taking a typical day, which on my last check was last Thursday, there were some 82,000 brick turned out at this plant with sixteen employees. We will have testimony on this. I just want to give you an illustration of the importance of the invention and of its commercial value. Heretofore, as far as we are aware, all the brick plants have usually figured, I think, on about 2,000 brick per man per day; but with the present kiln it is possible to put out in excess of 4,000 brick per man per day. We will give your Honor some idea of the increase in the output, which is, of course, very important, especially at the present time, when there is a shortage of manpower.

I do not know that there is anything further your
27 Honor might want to hear from me in connection
with this. If there is anything further you would
like to have me explain in connection with the invention, I shall be glad to do it.

The Court: No, I think not.

Mr. Garvey: We can get some additional information from the witnesses as to the *modus operandi,* and so forth.

OPENING STATEMENT ON BEHALF OF THE DEFENDANT.

Mr. Whitehead: If your Honor please, the case simply turns on this—the prior art is apparently close—whether these broader claims that were here before the Court define an invention. The Office recognizes that the man made an invention in certain respects and has allowed claims limited thereto. Those claims that counsel referred to—four or five—are as close as possibly could be drawn, and it is our position that they were not obtainable in view of certain prior patents. That is what the case is, and we are standing on the position taken by the Examiner and by the Board of Appeals.

Mr. Garvey: Shall we proceed with our first witness?

The Court: Yes.

Thereupon THOMAS SOMERVILLE III was called as a witness for and on behalf of the plaintiff, and being then and there duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified as follows:

Direct Examination by Mr. Garvey:

28 Q. State your name, please. A. Thomas Somerville III.

Q. What is your occupation? A. Brick manufacturer.

Q. How long have you been engaged in the manufacture of brick? A. Since 1935.

Q. Prior to that time what did you do? A. I was engaged in the manufacture of sewer pipe—terra cotta sewer pipe—from 1921. In fact, I still am engaged in the manufacture of sewer pipe today.

Q. Are you familiar with the invention here at issue? A. Yes.

Q. State briefly the conditions and circumstances under which it came to your attention. A. Mr. Clark is an employee of the Washington Brick Company, and I told him that I was interested in building a plant that would make a good common brick in Washington.

Q. May I interrupt you, please? Do you have reference to Mr. John R. Clark, the applicant in this case A. That is right. Shortly after that he brought in a rough sketch, which is the plant that we now have—which was like a plant we have in Muirkirk.

He asked me what I thought about it, and after examining it and studying it considerably, I told him I thought that it was possible to build a plant along those lines. So after drawing up plans—rough plans—on it, he wanted further information, and I requested that Mr. Clark go to Columbus, Ohio, to see Mr. Garve—T. W. Garve. Mr. Garve is the outstanding structural engineer for plants—

29 structural clay plants—having constructed plants in
this country as well as in foreign countries. He is also a civil engineer, a ceramic engineer, and, I believe, an architectural engineer.

Also at that time in Columbus, Mr. Clark saw Mr. Lovejoy. He is the dean of the ceramic engineers in this country.

Mr. Clark asked their opinion of this plant that we proposed to build. After talking to those gentlemen, they told us that they were thoroughly convinced that the plant could be built and made to run successfully. After getting their opinion on it—and others connected in our business—we proceeded to construct the plant that we now have in Muirkirk, Maryland.

Q. What did Mr. Garve have to do with the construction of the plant? A. He took the rough plans that we had and designed the plant from the rough sketches.

Q. Did he make the working drawings of the plant? A. That is right.

Q. Approximately what did this plant cost to construct? A. A little over $250,000.

Q. When did you begin operation of it? A. In 1938.

Q. Has it been operating continuously since that time? A. Yes, it has, with the exception of repairs.

Q. What have you found to be the maximum per diem capacity of the plant? A. 96,000 brick per day.

Q. Have you actually manufactured 96,000 brick
30 in one day in that plant? A. Yes, sir.

Q. With how many men, approximately? A. Seventeen men.

Q. How does that compare with other brick plants within the realm of your knowledge? A. I don't know of any brick plant in this country that can produce as many brick per day with that number of men.

Q. Did you make any effort at the time this plant was in construction or prior thereto to determine the relative merits of this plant—that is, the Clark kiln—and some other standard brick-making plant—any other standard brick-making plant? A. Yes, we had occasion to make comparisons, because part of our business is the purchasing and handling of brick from out of town. We have had occasion to be around many brick plants, and we know the number of men they use to produce brick per day. Ours is exceptionally low.

Before we manufactured this plant, we had a sketch made of the number of men that were used on our old plant and also the number of men that would be necessary to run the new plant. We had one of the men in our organization draw up a sketch.

Q. I hand you a paper, Mr. Somerville, and ask you if you can identify it. A. Yes, that is the sketch Mr. Kissinger made.

Q. What does it show? A. This is our new plant. It shows the clay bank, the clay-preparing kiln, and then the center house and the kiln. This is the old plant.
31 We have put here the number of men used in the new plant and the number of men we used in the old plant. It is our original estimate. You notice that we have three men there. When we actually started to use this plant to manufacture, we could do with two men there. Here we had two men, and we needed only one man. For setting we had seven men, and we found out we could use six men.

Over in the burn when this was designed, our men went on two 2-hour shifts per day. But those men have been placed on 8-hour shifts, so we have had to increase that to three instead of two men.

Q. I notice at the bottom of this drawing that you have total men to operate, 18; 72,000 brick capacity; 4,000 brick per man. Just what does that mean? A. That means that we need eighteen men to operate this plant. Our average capacity of that plant is 72,000. Incidentally, that is not today.

Q. Was this estimate made some time ago? A. Yes.

Q. Before the plant was completed? A. That is right.

Q. Was that the estimated capacity at that time? A. That is right.

Q. In 1938? A. That is right; which would average 4,000 brick per man per day. In the old plant we used 45 men to make 90,000 brick, which is an average of 2,000 brick per man per day. In other words, the new plant will give us twice the number of brick per day per man.

32 Mr. Garvey: If the Court please, I should like to offer this in evidence as Plaintiff's Exhibit 2; and also, if there is no objection, I should like to substitute for the original a white photostatic copy.

The Court: Very well.

(A white photostatic copy of the plan was thereupon received in evidence and was by the Clerk of the Court marked "Plaintiff's Exhibit No. 2.")

By Mr. Garvey:

Q. Has there been any publicity given to this particular plant, that you know of? A. Yes, we have received quite a bit of publicity through our trade journals. After the plant was completed, or rather during the construction of the plant, it being an entirely new plant, we did not go out and advertise the fact that we were building a new plant—but after it was completed, one of the field men of our clay journal—that is, the Brick and Clay Record—asked if they could publish an article in their magazine, which they did.

Q. I hand you a publication and ask you if you can identify it and tell us what it is. A. Yes. That is a picture of our plant.

Q. What is the publication? A. The Brick and Clay Record.

Q. What is the date? A. That is the clay journal of our industry.

Q. What is the date of publication? A. October, 1938.

Q. What is on the front cover of that magazine?
33 A. There is a photograph of our plant.

Q. Do you know whether or not there is in that publication an article concerning your plant? A. Yes, there is.

Q. At what page? A. Page 12.

Q. Was the publicity given in the publication which you have just identified in any way solicited by the Washington Brick Company? A. No, sir.

Mr. Garvey: If the Court please, I will offer that publication in evidence as Plaintiff's Exhibit 3.

The Court: Very well.

(Brick and Clay Record, October, 1938, was thereupon received in evidence and was by the Clerk of the Court marked "Plaintiff's Exhibit No. 3.")

By Mr. Garvey:

Q. I hand you another publication and ask you if you can identify it. A. This is a Brick and Clay Record.

Q. What is the date of it? A. April, 1939.

Q. Is there in that publication any reference or any article pertaining to your plant? A. Yes, there is an article written on page 26.

Q. By whom? A. By Mr. T. W. Garve.

Q. Did you solicit Mr. Garve to write that article
34 for you? A. No, sir.

Q. Did he write it of his own volition? A. Yes, sir.

Mr. Garvey: I now offer this publication in evidence as Plaintiff's Exhibit 4.

(The Brick and Clay Record, April, 1939, was thereupon received in evidence and was by the Clerk of the Court marked "Plaintiff's Exhibit No. 4.")

By Mr. Garvey:

Q. Has any other unusual recognition been given to this plant, within the realm of your knowledge? A. Yes. As a result of the construction of this plant, we have had ceramic engineers and clay manufacturers from not only all over this country, but we have had three from Australia, one from Holland, three from South Africa, one from Peru, and one from Equador that have been to this country to inspect our plan.

Q. I hand you a booklet and ask you if you can identify it; and if so, as what. A. "A Brickmaker's Holiday."

Q. Do you know who the author of that booklet is? A. Yes; Mr. Garlick.

Q. Who is Mr. Garlick? Do you know? A. Mr. Garlick is superintendent of a plant in South Africa.

Q. Did he visit your plant while he was in the United States? A. Yes, sir, he did.

35 Q. What was the occasion of that visit? A. Well, the way he happened to come, he was on a trip to look over brick plants in this country, and the Structural Clay Products Institute, which is the institute of our industry, suggested that he should by all means go out to see the circular system built in Muirkirk, Maryland, which is our plant. So he left their office and came out to look at our plant in Muirkirk.

Q. What was the occasion, if you know, of Mr. Garlick's writing this booklet? A. Well, this booklet is a sort of diary of his trip all around the world.

Mr. Garvey: If the Court please, this is admittedly something quite unusual. This gentleman, if I may make the observation in the record, as I understand it, toured the world, and especially brick plants throughout the world. This included the Washington Brick Company; and so far as we are aware, this is the only brick plant he took time to look at while he was in the United States. He made an observation about the plant, which I should like to read into the record from this booklet, if I may, subject to objection after I have finished reading it. I shall not read all of it; I shall read just the pertinent part beginning on page 41.

"An overnight run brought me to Washington, D. C. No, I had not come here to see the Capitol, White House, or any of the other wonderful buildings you read of, nor did I come to gaze on any great man's Tomb or Monument! Believe it or not, I had come to see a Brickworks!

"Mr. T. W. Garve, with whom I had been cor-
36 responding, was with Mr. J. R. Clark at the new plant
of the Washington Brick Company. The plant, which
is something new in lay-out, was nearing completion when
I arrived.

"It was still quite early when I got fixed up at an Hotel. Before breakfast I rang through to Mr. Garve. I was in luck, as Mr. J. R. Clark was coming into the City and would pick me up. He duly arrived, and took me along to see his 'baby.' I had heard about this novel plant from time to time on my way East; now I was here to see it for myself.

"I will not go into details of the construction and operation, except to say that the de-airing machine is mounted on a turntable which is surrounded by a circular kiln. The kiln is operated continuously, but unlike the usual circular tunnel kiln, the flow is permanent and the kiln itself in the form of hoods is moved round above the floor. The hoods are of steel, lined with insulating fire brick. The crushing unit is situated a little distance from the machine and kiln. The material is brought in on side dump cars, tipped into a granulator which feeds to a set of conical rolls for extruding stones, then through another set of rolls on to a conveyor belt which carries the crushed material over the kiln to a circular hopper directly in the centre of the plant. From there it is fed into the brick machine. When operating, the off bearing belt of the machine extends over the kiln floor, the packers setting direct on to the floor, the machine being rotated from time to time as required. A good description of this plant was published in the October, 1938, issue of the 'Brick and Clay Record'."

That, of course, is the Brick and Clay Record which 37 we have already introduced. Would your Honor be interested in looking at this booklet?

The Court: No; you have read from it.

Mr. Garvey: You may cross-examine, Mr. Whitehead.

Mr. Whitehead: I have no cross-examination.

Mr. Garvey: That is all, Mr. Somerville.

(The witness was thereupon excused and retired from the witness stand.)

Mr. Garvey: Mr. Clark.

Thereupon JOHN ROBERT CLARK, the plaintiff herein, was called as a witness for and on his own behalf, and being then and there duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified as follows:

Direct Examination by Mr. Garvey:

Q. State your full name, please. A. John Robert Clark.

Q. What is your occupation? A. Sales manager for the Washington Brick Company.

Q. How long have you been connected with the Washington Brick Company? A. Since 1935.

Q. Prior to that time what did you do? A. I operated a brokerage business of my own, handling clay products.

Q. Did you come in contact with the Washington
38 Brick Company in your occupation? A. I did.

Q. In what way? A. No; I did not come in contact with them prior to 1935.

Q. What about Mr. Somerville? A. Yes, I knew Mr. Somerville some years before the Washington Brick Company.

Q. Did you have any business relations with him? A. Yes, I used to sell them quite a lot of sewer pipe.

Q. You sold Mr. Somerville, or his company, sewer pipe prior to the time you became connected with the Washington Brick Company; is that correct? A. Yes; I would say from 1922 or 1923 on to 1935.

Q. Have you been continuously engaged in the ceramic business since 1922 or 1923? A. Yes.

Q. When did you first take up this invention with Mr. Somerville? A. I first took it up with him in 1935, I think—in the summer of 1935.

Q. Were any sketches of the invention made at that time, if you know? A. Well, we made various and sundry sketches, yes. I had been fooling with the idea since 1933, prior to the time that we started the Washington Brick Company.

Q. Did you file application for a patent prior to this one? A. Application for patent was filed in 1936, I think, in November.

39 Q. Did that application cover substantially the same invention, do you recall? A. Yes.

Q. Mr. Clark, will you take these sheets, these prints of the drawings, and just briefly outline to the Court the manner in which the kiln operates, starting with the depositing of the ware in the ware-forming mechanism, Figures Nos. 1 and 2? A. Figures Nos. 1 and 2. In the first operation the clay is delivered into the clay-preparing house.

Q. Which is what number? A. No. 24. From there it is prepared and delivered to a conveyor belt which carries the clay—

Q. (Interposing) What is the number of the conveyor belt? A. No. 25. (Continuing) which carries the clay into the center house or manufacturing house, which has a turntable.

The clay is fed into the brick-making machinery and is extruded in the form of brick and delivered on to a conveyor belt, No. 28, which carries the brick into the kiln.

Q. What kiln is it first carried into? A. It is first carried into the setting and drying operation. In the setting and drying operation we handle it in three tiers. In other words, the first set in the kiln is dried; then the conveyor is raised to the second set, and that is dried; then the top set is put on. The center turntable, that the conveyor is attached to, turns as the brick setters are setting the ware in the kiln. In other words, the conveyor delivers brick right to the setters as they set them.

Q. Is there any hood on the setting and drying chamber? A. Not at that stage; there is no hood on there, no. Do you want me to continue?

Q. Just continue. What is the next cycle of operation? A. After this kiln is set out and dried, then the pre-heating hood is pulled over it. The firing hood at that time has fired a full charge of brick or a full kiln of brick, and during the process of the firing the heat is inducted or the heat is transferred by a high-temperature fan from the fire to the pre-heating hood. This transfer of heat will heat the brick in the pre-heating hood up to somewhere between 800 and 1000 degrees.

By the Court:

Q. Fahrenheit? A. Fahrenheit. So when you move forward, then, the firing hood is over the pre-heating chamber, which has been pre-heated.The pre-heating hood is over this ware that has just been set and dried. The cooling hood, following the firing hood, then, is over the chamber that has just been released from the firing hood, which is hot. This pre-heated chamber, then, that goes on fire, being heated up to 800 to 1000 degrees Fahrenheit, is ready to go under full fire. We can immediately start the burning-off process, which will take approximately 48 hours to complete.

After this is completed, the three units—cooling, firing, and pre-heating—are moved one stage further—one kiln further—which has already been set and dried. We have
two of these complete units on the circle, so that
41 there is no delay in the moving on account of setting
in stages. In other words, if we set in the morning on the bottom of one kiln floor, in the afternoon we set in the middle or bottom, or whatever it may be, of the kiln floor on the opposite side of the circle. Immediately after setting the brick, you can open the gates into the tunnel.

By Mr. Garvey:

Q. What do you mean by "the gates"? A. Those are the gates that we use for dampers.

Q. What are the numbers of the dampers? A. No. 67. The cross-dampers are No. 37.

Mr. Garvey: May I correct that, if the Court please? Apparently it is shown in Figure 3. The cross-damper is 34, which fits in the guides 33. That is just for the sake of clarity, in order to get the right numbers.

The Witness: There are sixteen kiln floors on the circle, and they are divided with partition walls. These partition walls are slightly smaller than the hoods, which allows the hoods, as the kilns are burned off, to move over the partition walls.

There is a main flue which handles all the combustion gases; also the waste heat from the cooling kiln. There is a circular flue around the entire center of the kiln. There are cross-flues (indicating) that are built under each floor—under each kiln floor.

The system that we are using at present is a high-temperature fan to handle the combustion gases from the firing kiln direct to the pre-heating kiln just in front of it. In
other words, it takes the gases down through the
42 ware, out through the cross flue, into the main tun-
nel, and then it goes up through the fan and down in
the bottom of the pre-heating kiln. From there it exhausts itself up through the ware, and on its way up the ware absorbs whatever heat there is in it.

These two units, the firing kiln and the pre-heating kiln, act as a unit; and when that is in operation, the main flue is dampered off, so that it forms a complete operation.

Now, the waste heat from the cooling kiln is transferred with a high-temperature fan in the opposite direction. In other words, there are two of these units on the circle traveling counter-clockwise. The cooling kiln in one unit is opposite; or the nearest kiln to it in the other unit is the pre-heating kiln, so the waste heat from the cooling kiln in one unit is transferred through the main flue to the drying operation in front of the other unit. Likewise, the other unit: the waste heat from the cooling kiln is transferred to the drying operation in front of the pre-heating kiln of the other firing unit.

By Mr. Garvey:

Q. After the cooling operation has been completed, are the brick then ready for commercial use? A. Yes; just as soon as we are ready to shift the next kiln forward. Every 48 hours—approximately 48 hours—we move one kiln forward, and that gives you finished ware out of the cooling kiln.

Q. How are the brick removed from the cooling chamber? A. Well, of course, that leaves them open, and we back the trucks right in the kiln and unload them.

43 Q. You load the bricks which are in the kiln? A. Back them right into the kiln and load them right up—stack green ware out in the open and unload finished ware in the open.

Q. How are these chambers separated one from the other? For instance, you have your setting and drying and your pre-heating and firing. How are they separated? A. They are separated by a partition wall.

Q. Is this it, shown in Figure 18 (indicating)? A. Yes.

Q. Is it essential that partitions be employed? A. No, I would not say it is absolutely essential. You could form partitions with the green ware itself or with the ware.

Q. And thereby eliminate partitions altogether? A. Yes, you could eliminate them altogether; in fact, at one time we figured on doing it. We have not got around to doing it yet.

Q. Are you familiar with the drawing identified by Mr. Somerville, Plaintiff's Exhibit 2, which I now hand to you? A. Yes, sir.

Q. Do you know who made that drawing? A. Yes; Mr. George Kissinger.

Q. Do you know what it is intended to represent? A. Well, it is intended to show the comparison between what we estimated on the new plan.

Q. What do you mean by "the new plan"? Your invention? A. Yes; the circular system as compared with the plant that we operated prior to the time of building this plant.

44 Q. Do you know whether or not that estimate has proved to be true in actual use? A. Yes, it has; in fact, we underestimated our total capacity as well as the amount of labor that we would use.

Q. Mr. Clark, have you seen very many brick kilns in operation other than the one at the Washington Brick Plant? A. Quite a few, yes, sir.

Q. In what parts of the country? A. Oh, in Pennsylvania, Virginia, Tennessee, South Carolina, and North Carolina.

Q. Did any of the plants that you saw include movable hoods? A. None.

Q. Have you ever seen a movable hood in any brickmaking plant? A. I never have.

Mr. Garvey: That is all. You may cross-examine, Mr. Whitehead.

Mr. Whitehead: I have no cross-examination.

(The witness thereupon was excused and retired from the witness stand.)

Mr. Garvey: Your Honor, we had just one other witness. He is relatively unimportant; he would simply be called to identify a drawing. If Mr. Whitehead would be willing to stipulate that if Mr. Kissinger were called as a witness, he would testify that he made this drawing at or about the time indicated—that is, Plaintiff's Exhibit 2—that would be satisfactory.

45 Mr. Whitehead: I have no objection to your introducing it; I am raising no question about it. I understood Mr. Clark to testify that Mr. Kissinger had made it.

Mr. Garvey: Your Honor, that is our *prima facie* case.

Mr. Whitehead: I introduce in evidence as Defendant's Exhibit 1 this folder that I hand up to your Honor.

(The folder of the Patent Office in Clark vs. Coe, Civil Action No. 17,242, was thereupon received in evidence and was marked by the Clerk of the Court "Defendant's Exhibit No. 1.")

Mr. Garvey: Is that your entire case, Mr. Whitehead?

Mr. Whitehead: Yes.

Mr. Garvey: I should like to call Mr. Clark back to the stand.

The Court: How long will it take?

Mr. Garvey: Ten or fifteen minutes.

The Court: I will take a recess until half-past 1.

(At 12:30 o'clock p. m., a recess was taken until 1:30 o'clock p. m. of the same day.)

Afternoon Session.

The Court: You may proceed.

Mr. Garvey: If the Court please, I should like to recall Mr. Clark.

The Court: Very well.

Thereupon JOHN ROBERT CLARK, was recalled as a witness in behalf of the plaintiff in rebuttal, and having been previously duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified further as follows:

46 Mr. Garvey: If the Court please, I want it understood that I am now calling Mr. Clark as a practical brick man and not at all as a patent expert. I should like to have him go over the prior art that has been cited by the Patent Office and answer some questions that we have prepared for him on it. This is not in any way connected, however, with the claims that are involved in this case.

DIRECT EXAMINATION by Mr. Garvey:

Q. Mr. Clark, I now hand you the prior art introduced by the defendant in this case and ask you to consider the first patent, which is a patent to Guthrie. Please tell the Court whether or not you have had an opportunity to study that patent. A. Yes, I have. I have gone over it a number of times.

Q. Does that patent show a movable hood? A. No, it does not.

Q. Have you ever seen a brick kiln constructed like the Guthrie patent? A. No, I have not.

Q. Will you please refer to the next patent, which is a patent to Knacker? Have you also studied this patent? A. Yes, I have.

Q. Will you state whether or not the Knacker patent includes a movable hood? A. No.

Q. Have you ever seen a brick kiln constructed like that shown in the Knacker patent? A. No, sir.

47 Q. Will you turn to the next patent, the patent to Fiske? Have you made a study of this patent? A. Yes, I have.

Q. Does this patent include a movable hood? A. No, it does not.

Q. Have you ever seen a brick kiln constructed like the illustration of the Fiske patent? A. No.

Q. Will you tell the Court what part A is in the Knacker patent?

The Court: Which figure?

The Witness: In the Fiske patent?

By Mr. Garvey:

Q. In the Fiske patent—Figure 3 of the Fiske patent—relative to the element designated A. A. It looks to me like a movable top.

Q. How is it described in the specifications of the Fiske patent? A. Well, it says it is a removable top.

The Court: Where are you reading from?

Mr. Garvey: Page 3, column 1, beginning with line 14.

The Witness: "The kiln chambers have removable tops."

By Mr. Garvey:

Q. That is sufficient for the purpose of this question. How would the brick be removed from the Fiske kiln after the top had been removed? A. You would have to go down in there and get them out in some way or other.

Q. Do you mean from the top? A. Yes. I don't
48 know how you could get them out any other way.

Q. Why could you not remove the sides, as you do with the Clark kiln? A. Because the kiln is so constructed that there is no way to get them out except through the top.

Q. Where are the sides located? A. Down in the ground.

Q. Countersunk in the ground? A. Yes.

Q. What is the difference between that and the kiln here at issue, that is used at Muirkirk? A. Well, the kiln floor is level with the ground, and the hoods move directly off of them, leaving the ware exposed above the ground and accessible.

Q. They are accessible, are they, from all sides? A. From all sides.

Q. Please turn to the next patent, the patent to Kleymeyer. Have you had occasion to study this patent? A. Yes, I have.

Q. Does it include a movable hood or movable hoods? A. No, sir, it does not.

Q. Have you ever seen a brick plant constructed like that shown in the Kleymeyer patent? A. I have with many features described and some of the details, such as the crown, and so forth.

Q. What is the crown designated there? A. It is a brick arch.

49 Q. Designated? A. 11 stationary brick arch.

Q. Is that arch movable? A. No, it is not.

Q. Will you now refer, please, to the next patent, which is a Swiss patent? Have you had an opportunity to consider this patent? A. Yes, I have.

Q. Have you considered a translation of this patent? A. Yes.

Q. From whom did you obtain the translation? A. From you.

Mr. Garvey: For the purpose of the record, if the Court please, I might add that this translation was obtained from the official translator of the United States Patent Office.

By Mr. Garvey:

Q. Does this patent include a movable hood? A. No, it does not.

Q. What does this patent show? A. It shows two stationary hearths and a bell that is moved by some means.

Q. You say the bell is moved by some means? A. Yes.

Q. Where is it moved? What is the extent of its movement? A. It is moved from one hearth to another.

Q. Do you find in that patent a continuous kiln? A. No.

Q. Or a circular kiln? A. No.

50 Q. Have you ever seen a kiln of that kind in use? A. No, I have not.

Mr. Garvey: That is all. You may examine, Mr. Whitehead.

Mr. Whitehead: I have no cross-examination.

Mr. Garvey: That is all.

(The witness was thereupon excused and retired from the witness stand.)

Mr. Garvey: Does your Honor want arguments now?

The Court: Yes, sir.

OPENING ARGUMENT IN BEHALF OF THE PLAINTIFF.

Mr. Garvey: Now, if the Court please, let us see what it is we are trying to obtain the allowance of in this Court. It is true, as was indicated in the opening statement, that we have obtained allowance of twelve claims: ten before the Primary Examiner, one in interference, and one before the Board of Appeals. Twelve claims may or may not mean that a goodly measure of protection has already been obtained; it all depends on the quality of the claims. As your Honor well knows, the value of a patent is in the claims; in other words, the claims measure the protection of the patent.

We submit that we have here a very valuable invention. We submit, if the Court please, that this inventor is a pioneer in the use of a movable kiln with a circular or continuous floor. We know from the testimony here that this kiln has received unsolicited recognition not only in the United States but also from ceramic engineers in foreign countries. There of course has never been any advertising of this kiln; there has been no necessity for it, because it is operated under license by the Washington Brick Company.
51 Your Honor understands just what this kiln can do; that is, saving in manpower, increase in output, and so forth. In other words, we have just recently found that it is possible not only to double the output but, as a matter of fact, to nearly triple the output of brick, using the same number of men that had heretofore been used on a comparable kiln.

Getting down, now, to the claims that we have laid in this case, I wish to consider first claim 2. Why do we feel that claim 2 is allowable? Why are we not protected by the claims already allowed in the case? That is, what is there in claim 2 that should entitle us to allowance of the claim? I should think that that is a question your Honor wants answered.

We submit in this connection that we have in this claim novel combination. As your Honor well knows from the Leeds and Catlin case in the Supreme Court, and many other decisions, some of which are cited in my brief, others of which your Honor will find in Exhibit 1, it does not make any difference whether the elements of the combination are all old. They may be all old, they may be partly old and partly new; but if they are directed to a novel combination, they are patentable; and it is necessary, to anticipate them, that the combination entity be anticipated in a patent. Now, we submit that there is no anticipating reference for this combination, because in claim 2 we call for "a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln"; and we can stop right there, as far as a combination is concerned, because we submit that there is
52 not a single reference of record that shows that combination.

What has been cited to show a movable hood? We have this hybrid structure shown in the Swiss patent, a bell that is elevated and moved from one place to the other, or which, in some manner not clearly shown in the reference, may be transported on a track. We get no enlightenment to speak of from the specification as to how it may be moved. Entirely aside from that, it is not mounted on a continuous track, and it is not mounted on a circular kiln. Therefore, we submit that we are entitled to claim 2 because we have in that claim a novel combination which is not anticipated in any reference in the Office.

Furthermore, we submit that, even entirely aside from the matter of novelty of combination, it is not anticipated because even an expert could not combine these references to anticipate the claim unless he exhibited inventive genius. Therefore, the patents, even in the aggregate, cannot be construed to be anticipation of this claim.

If the Court please, I am going to skip from claim 2 to claims 9, 11, and 21, because they, too, are directed to patentable combination.

"9. A brick kiln including a floor and relatively movable hoods arched over the floor, certain of the hoods being provided, near their crowns, with heat-induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware."

Where do we have anticipation of that in the prior art? First of all, we do not have movable hoods, which form a
part of the organization called for in this claim;
53 namely, "arched over the floor, certain of the hoods
being provided, near their crowns, with heat-induction openings."

Yes, we can find in the prior art some kind of arch or some kind of side wall wherein there is a heat-induction opening, but it is not in the movable hood. We know that in the Knacker patent, for instance, there is a heat-induction opening through the top of the arch; but Knacker does not show a movable hood. Then, it must be borne in mind that this claim goes even further than that: "certain of the hoods being provided, near their crowns, with heat-induction openings." The other hoods, of course, do not have the heat-induction openings. I directed your attention to that in the opening argument, and also it was brought to your attention by Mr. Clark that the firing hood is the only one with heat-induction opening. The pre-heating and setting and drying, of course, do not have heat-induction openings in them.

Proceeding to claim 11, we find: "A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.''

Your Honor, this is the only claim we have in the case
where we do not include a movable hood; but we have
54 here a combination which consists of the hood of the
pre-heat kiln and the crowns in certain of the hoods
for passage of the heat therethrough, and in conjunction with the flue which communicates with each chamber floor, ''and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.''

Your Honor saw this morning how important that structure is in order to permit inter-circuiting of heat from one of these chambers to the other, so that we provide a flexible system which is at all times within the control of the operator. We have not had cited here a single reference which shows that combination.

The same is true of claim 21, which is similar, except that claim 21 is even more specific. It includes movable hoods arched over the floor; ''and suction means arranged to be placed in communication with any of said openings to withdraw inducted heat from the kiln through the openings in the floor of the latter.''

So we have in claims 2, 9, 11, and 21 a novel combination which is not shown in any of the prior art patents; and even forgetting the matter of novel combination, if you took and aggregated the prior art—put it all together—you could not, I submit, find an anticipation of these claims unless inventive genius was resorted to.

Now let us take the prior art. What does Guthrie show? Let us refer to Figures 5 and 6. Guthrie shows there a circular kiln. Does he show movable hoods? No, of course not. What he shows is simply an integral arch, if you please, the base of which is sunk in the ground so as to support the arch. Then, too, we must take into consideration such things as the means for transporting the brick into this arch. It is necessary to deposit them there in one spot. I am bringing this out to show the impracticability of this patent. In other words, we have to deposit all this brick on one spot, because the arch cannot be moved; it is an integral structure; whereas with ours, when we are loading the brick on the floor of the setting and drying kiln, we do not have any arch up there at all; we do not have any side walls. That is one of the big advantages of the movable hood. We just simply back the truck up there and load the brick manufactured. Obviously you cannot do that with Guthrie.

Then, too, how are the brick going to be distributed into all the chambers of the Guthrie patent? It is necessary that they be manually moved from one end of that kiln to the other; whereas our device, in view of the fact that we have a movable hood, which can be taken off of the setting and drying kiln, makes it possible to move that conveyor progressively—the conveyor which carries the green ware—from one end of that kiln to the other until it has been completely filled with the green ware. Those are the advantages that flow from the movable hood. The Guthrie patent, therefore, we submit, is not an anticipation of any of these claims, in that it does not show, among other things, the movable hoods. Consequently, of course, the results which we obtain could not possibly be obtained from the Guthrie device.

Let us proceed to the next patent cited. That is the patent to Knacker. Well, what we have said about Guthrie

applies with perhaps equal force to the device shown
56 in the patent to Knacker. Here again we have an integral structure. Call it what you will—whether it is an arch or anything else—the fact remains that it is an integral structure; there is no part of it that moves independently. Consequently, you cannot get the advantages that flow from a device where movable hoods are employed.

There is another disadvantage, if your Honor will look at Figure 2 of the Knacker patent. Notice the circular conduit there—I think it is M—and then the tributaries which extend from that. That conduit M carries heating gases which are introduced as shown in Figure 3. What do you have to do in this case, with this device? You have got to fire each kiln separately. You do that through these tributaries K, L, and so forth. What do we do? We have one kiln that takes the place of all these kilns for firing. We have just one firing kiln which is moved from one part of the floor to the other, so that the brick tiered around the circle may be progressively fired, instead of firing them all individually through this cumbersome and impractical means shown in the Knacker patent.

Th patent to Fiske is next. I do not believe it is a circular or continuous kiln, in the first place. Certainly there are no movable hoods. What have we? The Examiner says that we have a movable crown. Well, why not call it by the name that is given in the specification. It is called a movable top. What is it? It is an ordinary slab top that spans the distance of the pit in which the brick are tiered; and then when it is desired to move that flat slab, what do we have to do?

We must employ cumbersome apparatus which
57 superimposes on the kiln, connect the apparatus for that top, take it up, get it out of the way, wait for the brick to cool off, which takes a long time, because they are

down underground; and then, after they are cooled off, you have to get down there and dig them up one by one. How can a device of this kind be constructed even remotely to suggest the valuable invention that is here at issue?

The patent to Kleymeyer is in the same category as the patent to Knacker. It shows a circular kiln. It has no movable hood, of course. The chambers are independently fired; consequently, it has the same defects and deficiencies that were pointed out in connection with the Knacker and Guthrie patents. We do not have the movable hood; therefore, we cannot hope to obtain the advantages which flow from the movable hood.

Next we come to the Swiss patent. What does the Swiss patent show? Your Honor, let us evaluate this just as an expert would. Let us forget prior disclosure. Let us not do as the Examiner did—build up an anticipating structure while using Clark's device. Let us forget that we ever saw Clark's device and just calmly evaluate what we have in the Swiss patent.

We have in the description of the specification parts 1 and 2. These are elevated hearths which hold the ceramic ware 3 and 4. I refer to the fact that these are raised or elevated, mounted apparently on the ground, so far as I can tell. The specification does not help us out in that. Then, in the movement of the invention in Figure 1 we have the
so-called bell which is adapted to be raised and
58 lowered, by suitable hoisting apparatus, which is
not shown. We put that bell over one of these
hearths until the ceramic ware has been treated in some way not shown in the patent. After that cycle of treatment has been completed, then that hood is taken off and brought over to the other hearth and is put over the ceramic ware on that hearth. Can that be construed to be a movable hood, mounted on a continuous circle, or a circular multi-

part kiln floor? Certainly it is not continuous. The hood, if you want to call it a hood, may be mounted, so that it can be moved up and down; but it cannot be moved around the circular path. No such thing is done in the Swiss patent.

In the second figure of this same patent there is some variation which frankly I cannot figure out exactly from the specification. He shows the rollers, and apparently those rollers are intended to facilitate the transportation of that bell from one of the hearths to the other. How it is transported on tracks, I do not know, because your Honor will note that the lower end of the bell extends below the top of the hearth 2 in Figure 2, so that you could not move it directly. You would have to lift it or move it sideways in order to get it off there. So we have no continuity of movement. It would not be permitted in a structure of this kind. The same is true of the apparatus shown in Figure 3. Therefore, we have here a device which is incapable of operating in the same manner as the Clark kiln.

What do claims 4 and 5 call for? They are principally rejected on the Swiss patent. Let us first consider claim 4. This calls for a "circular multi-part kiln floor." Does
59 the Swiss kiln show a circular multi-part kiln floor?
Certainly there is nothing in the drawing to warrant that inference, and certainly there is nothing in the specification to indicate it. Then, why does the Examiner consider this as anticipation of this claim? Because he has to read into, or because he is reading into, the Swiss patent this essential structure of the applicant's invention, namely, "a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts."

There are not hoods in the Swiss patent. There is one hood; therefore, there is no selectivity of position; there is no interchange of those hoods in any way, shape, or form.

That is what we have, for the purpose that has been brought out in the testimony. In other words, we must have this selectivity in order that the hoods can be used for preheating or for cooling or for setting and drying. These hoods are interchangeable. Of course, the firing hood always remains the same. So we have this plurality of hoods in battery in order to complete this cycle of operation, which manifestly could not be obtained in a structure such as that shown in the Swiss patent.

Claim 5 calls for "A brick kiln including a continuous kiln floor." Here again the Swiss patent certainly does not show a continuous kiln; nor does it show any analogous structure; nor does it show "hoods arched over a portion of said floor and movable for positioning over the latter," because it does not show just how these can be moved over
the floor. If it is moved over the floor, it is in a man-
60 ner that is certainly not clearly described in the
specification.

Your Honor, here is something that I construe to be of the utmost importance in this case. Let us take claim 5 and parallel that claim with allowed claim 6. I will read, first of all, claim 6. It reads as follows:

"A brick kiln including a continuous kiln floor, partitions arranged at intervals on said floor, hoods movably mounted on opposite sides of the floor, arched over the floor and partitions and engageable with the latter."

To repeat: "A brick kiln including a continuous kiln floor." In that respect, it is exactly the same as claim 5. "Partitions arranged at intervals on said floor." Claim 5 does not include partitions. "Hoods movably mounted on opposite sides of the floor." That is substantially the same as claim 5. Claim 5 says: "hoods arched over a portion of said floor." Then, in claim 6 we proceed with: "arched over the floor," after the recitation "mounted on opposite sides of the floor." Then: "and partitions and engageable with the latter." In other words, the hoods are engageable with the partitions and are movable over the floor. What is the difference between those two claims? The only difference between claim 5 and claim 6 is the recitation of the partitions; there is no other difference between the claims whatsoever.

Now, why was it that the Examiner allowed claim 6 but did not allow claim 5? Is that partition so all important? Is that an essential limitation in the case? Should you lumber up a claim of this kind with a limitation of this kind in there—with the word "partitions"—when
61 you heard the witness testify that the partitions are not necessary; that this device can be used with the green ware as partitions? That is why we want this claim, if the Court please. That is why we think a claim like this is necessary to the full coverage of the present invention, because it would certainly be a sad commentary on this patent, with the advance it admittedly is in the art, if someone else can come along, omit the partitions, and be scot free of the claims of this patent.

Let us compare claim 4 with claim 7. Claim 4 reads as follows:

"A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts."

Now let us consider the allowed claim 7. It reads as follows:

"A brick kiln including a continuous kiln floor."

The only difference between the claims so far is that claim 4 calls that "a circular multi-part kiln floor"; this calls for "a continuous kiln floor."

"partitions arranged at intervals on said floor." There is a difference from claim 4.

"hoods arched over the floor and partitions, and movable on the floor for optional positioning over the partitions."

So the only difference between claim 4 and claim 7 is in the partitions. It would be different if those partitions were absolutely necessary to the operation of this device. You might say, "What do you want claim 4 for? It
62 can not be used without the partitions"; and so forth. But here we have the testimony of the inventor himself that, as a matter of fact, they considered in the very beginning the use of this device without these partitions.

So, your Honor, does it not seem unfair that these claims should not be allowed, to afford this coverage which seems so essential? Or are we going to leave that gap or opening in there so that someone can come along in the art, seize on that limitation in the claims, and build a kiln without partitions? That is why we have gone to the expense and taken the trouble of bringing this case up here. We honestly feel that the Patent Office is in error in not allowing all the claims in the case, especially these two broader claims, namely, 4 and 5; and we submit them for your Honor's consideration.

ARGUMENT IN BEHALF OF THE DEFENDANT.

Mr. Whitehead: I was rather interested, your Honor, in not hearing the word "invention" once in this case. Not one single time has the word "invention" been used. Yet the Supreme Court has said, time out of mind, that invention must be shown, otherwise there is no patentability.

When the Cuno Engineering case was argued, I understand that one of the prominent patent attorneys in New York argued to the Supreme Court that they were wrong in 1850 in holding in Greenwood v. Hotchkiss that invention was necessary, and in holding the patent invalid because it lacked invention. He pleaded to the Court that it abolish that wrong practice, or that practice that had prevailed for ninety years.

If you will notice that decision, the Court went out of its way not only to say that there always must be invention to sustain a patent, but it cited innumerable 63 instances in which they have so held, and the Court wound up that part of the decision with this sentence: "We therefore do not find that we should abandon the Hotchkiss-Greenwood theory, that respondent's counsel would apparently have us do."

I say there is not one word about invention here. There has been a great deal of talk about anticipation; that is to say, that unless the claim is literally, verbally anticipated, you cannot reject it, and that you should allow a patent because of the novelty of the device. Again, that is a theory that the Supreme Court has disapproved; and it has been disapproved time and again by the Court of Appeals of the District of Columbia. I sometimes express it by saying that novelty and utility together do not spell patentability. You have got to add "invention" to make what you do patentable.

There is another trouble with this argument: that is, they talk about, first, what the machine or what the apparatus is. Then they pick up a claim that does not cover the apparatus, except a small part of it. Now, they say this is not anticipation. Again I say that is not the theory. You must find that when they drew their claims in certain ways, and they had to find something that was inventive, but in the broader statements of what they had, they did not define anything that was inventive—you will have to find that invention was in the other claims which were refused in order to make them allowable.

It seems to me that that goes to the root of the case. I have not heard anything argued but the question of utility

and novelty. This claim No. 2 was rejected on the
64 theory that the combination in the claim was old, ex-
cept for the particular kind of kiln. It was rejected on the ground stated by the Court of Appeals years ago in the McNeil case, namely, that you do not make a new and patentable combination by putting some new element into an old combination. Now, it is perfectly true that you can take a lot of old things and put them together and make a real invention. But the converse is not true; that is, that every time you put a lot of old things, or even a lot of new things, together you have necessarily made an invention. They are two entirely different things.

The Examiners and the Board have stated clearly why they think these claims do not define invention.

There is one other point I should call your attention to, and that is the argument that because the Examiner allowed claims 6 and 7, then by the same token he must allow claims 4 and 5, or that you must find them allowable. The Court of Appeals of the District of Columbia decided flatfootedly that you cannot test the allowability of a claim by the fact that the Board or the Examiner allows another claim along that same line. There is a rather interesting thing about that decision. The Court set down three different appeals for rehearing and heard them all at one time on that same question: whether you could use the allowed claims, either in the same case or in a combination of cases, as the measure of allowability of the claims before the Court; and the Court said they could not.

Then, you could take it in this way: that the Court of Customs and Patent Appeals has long taken that same position and has ruled that it is useless to so argue in that
65 court for the allowability of the claim. It is useless
to point out to the Court that another claim was allowable; because that is not the test.

The Court: It is not the test, but it shows what the experts in the Patent Office considered to be allowable as invention.

Mr. Whitehead: In one sense of the word, yes. Invention comes in when you build beyond the broad anticipation. That is where invention comes in. But nobody, of course, can lay down, and nobody has ever laid down, a standard of what is invention. If somebody were to make invention comparable to a mental slide rule, so that all you had to do was take out your slide rule and calculate according to the standard, there would not be any cases in the courts. But there is no such thing, and nobody has ever made that invention, so far as I have ever heard. So I submit, therefore, that the case is rightly decided and that the conclusion should be sustained.

CLOSING ARGUMENT IN BEHALF OF THE PLAINTIFF.

Mr. Garvey: If your Honor please, Mr. Whitehead referred to the fact that we did not mention invention. There have been twelve claims allowed in this case. Certainly the Patent Office has regarded the device as being inventive.

On this matter of considering the parallel claims, as we have done, I doubt very much if any decisions can be produced which will show this to be erroneous practice. It is a most natural practice, I think, to follow, and it is a practice which is recognized. In other words, why should not the Court consider these things? Did the Examiner in the Patent Office and did the Board of Appeals know 66 that this partition was not necessary? They did not hear the testimony of Mr. Clark. Your Honor heard that testimony. Your Honor has information that the Board of Appeals did not have and that the primary Exam-

iner did not have. Would they have allowed these claims if they had listened to the testimony of this gentleman and if they had had the opportunity to go into the case in the way we have here today? I believe that they would have. I do not think that they would have rejected these claims. I think it is reasonable to assume that if they had had that information before them, both of these claims, claims 4 and 5, would have been allowed, and the other claims also standing in this case would have been allowed, because I cannot conceive that they would compel us to include in claims 4 and 5 limitations of partitions, such as was done in claims 6 and 7 in order to get them allowed. They are unnecessary limitations, as it now pans out. Did Mr. Whitehead give us any enlightenment on that, as to just why these claims should be allowed, because we have partitions in there? Is it partitions that carry these claims. I do not believe it is. We have seen partitions in every one of these devices cited by the Patent Office. For instance, do we not have partitions in the Kleymeyer patent? Do we not have partitions in the Guthrie patent? Do we not have partitions in the Fiske patent? Therefore, it was not partitions that carried those claims. It was the other part of the claims that carried them. Therefore, we should have, we submit, claims that are not lumbered up with this limitation and that will not, as I said a few mintes ago, permit someone now to come in and invade this field, erect a kiln, omit
67 the partitions completely, and void the patent.

On the matter of combination, I shall take only one minute. I just want to call your Honor's attention to what I believe is a recognized case on combination, the case of Leeds and Catlin vs. Victor Talking Machine Company. I have used it successfully a number of times myself throughout the United States, and it has been accepted, so far as I know, by every court whose attention has been called to it. It does not require a new element to be included in the combination. It says:

"A combination is a union of elements, which may be partly old and partly new, or wholly old or wholly new. But whether new or old, the combination is a means—an invention—distinct from them. They, if new, may be inventions and the proper subject of patents, or they may be covered by claims in the same patent with the combination."

Your Honor will find other combination decisions of the Court of Appeals, perhaps from this court, on pages 56 and 57 of Plaintiff's Exhibit 1, the file wrapper.

That closes our case. Thank you, your Honor.

The Court: I will take the case under consideration.

(Thereupon the instant case was concluded.)

Portions of Plaintiff's Exhibit No. 1.

PETITION WITH POWER OF ATTORNEY.

To the Commissioner of Patents:

Your petitioner, JOHN R. CLARK, a citizen of the United States, and a resident of Bethesda, in the County of Montgomery, and State of Maryland, whose post-office address is 404 Fairfax Road, Bethesda, Maryland, prays that letters patent may be granted to him for the improvements in a

KILN FOR BRICK AND OTHER CLAY PRODUCTS set forth in the annexed specification; and

He hereby appoints Bernard F. Garvey, Esq., of 606 Denrike Building, 1010 Vermont Avenue, N. W., Washington, D. C., his attorney with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

Signed at Washington, in the District of Columbia, this 9 day of March, 1939.

JOHN R. CLARK,
Inventor.

SPECIFICATION.

To All Whom It May Concern:

Be It Known That I, JOHN R. CLARK, a citizen of the United States, residing at Bethesda, in the County of Montgomery and State of Maryland, have invented certain new and useful improvements in a

KILN FOR BRICK AND OTHER CLAY PRODUCTS of which the following is a specification:

My invention relates to kilns for use in the manufacture of brick and other clay products, this being a continuation in part of my prior allowed application, Serial No. 109,597, filed November 6, 1936, it being an object of my invention to provide a compact kiln which can be operated with a minimum expenditure of time and labor and which includes a novel method of drying, heating, firing and burning the ware.

It is also an object of this invention to provide a self contained kiln which is preferably of circular or like construction, having the ware forming mechanism arranged within the confines of the kiln and in direct communication with the latter so that the formed ware may be immediately transported to the kiln and set up on the kiln floor preparatory to drying, preheating and firing. It is also within the contemplation of this invention to employ a kiln in which the floor is stationary with hoods or covers mounted thereover which are movable to permit variation in the treatment of the ware located in different zones on the kiln floor, every portion of the floor, upon which the ware is tiered, being perforate to permit the passage of heat therethrough after impingement with the ware.

After much experiment, I have found that a continuous kiln divided into chambers, all of which latter communicate with a common flue, the chambers intercommunicating, by way of the flue, in conjunction with the use of dampers or baffles, tends to facile transfer of heat, at the option of the operator, into any of the chambers. The heat is interchanged between the chambers through the instrumentality of suction means interposed at predetermined points in the flue, the suction means being mobile to permit movement complementing the movement of the portable kiln chamber hoods forming a part of this invention.

It is also an object of this invention to provide top and end seals for the chamber partitions which may be moved into engagement with or disengagement from the partitions, the seals, when in a closed position, effectively preventing the passage of heat from one chamber to another, between the hoods and partitions.

I have found that best results are obtained by introducing heat near the top of the firing chamber permitting the heat to permeate the tiered brick from top to bottom, the heat being withdrawn through the perforate floor of the chamber into a continuous flue, which latter is in communication with all of the chambers.

Other objects of the invention will be manifest from the following description of the preferred forms of the invention, taken into connection with the accompanying drawings, wherein

Fig. 1 is a top plan view of a kiln constructed in accordance with the present invention, the clay conveyor being shown fragmentarily, and a portion of the continuous heat flue or conduit being also fragmentarily shown to disclose details,

Fig. 1a is a continuation of Fig. 1, showing in top plan, the clay conveyor extending into the clay preparing unit, the latter being shown in fragmentary section, the tracks upon which the clay is transported in dump cars into the clay preparing unit, as well as the grating upon which the clay is dumped, being also shown in top plan over the clay preparing mechanism,

Fig. 2 is a diagrammatical view of the entire plant, parts of which are shown in side elevation and parts in section,

Fig. 3 is a detail enlarged fragmentary sectional view taken through one of the kiln chambers illustrating to advantage the manner in which the kiln chambers communicate with the flue or conduit, the hood carrying tracks being shown in section on opposite sides of the kiln chamber floors,

Fig. 4 is a detail vertical sectional view taken on the line 4-4 of Fig. 3, looking in the direction of the arrows, and showing to advantage the sub-floor structure of one of the kiln chambers,

Fig. 5 is a detail fragmentary top plan view of one of the kiln chamber floors with most of the floor blocks removed, openings leading to the flues and flue tributaries being also shown,

Fig. 6 is an elevational view of one of the kiln chambers showing a partition wall with the seals arranged in proximity to the marginal edges of the wall, Fig. 7 is a detail fragmentary sectional view taken on an enlarged scale on the upper right hand portion of Fig. 6, looking in the direction of the arrows, showing to advantage the manner of mounting one of the partition seals, the latter being closed,

Fig. 8 is a detail fragmentary vertical sectional view taken on the line 8-8 of Fig. 7, and corresponding to an enlarged scale, taken on the line 8-8 of Fig. 6, looking in the direction of the arrows, the seal mounting being shown in end elevation,

Fig. 9 is a detail fragmentary transverse sectional view taken on the line 9-9 of Fig. 7, looking in the direction of the arrows, showing the end seal in closed position,

Fig. 10 is a detail fragmentary vertical sectional view taken on the line 10-10 of Fig. 6, looking in the direction of the arrows, showing one of the top seals in a closed position,

Fig. 11 is a similar view to that shown in Fig. 10, showing a modified form of partition and top seal,

Fig. 12 is a detail fragmentary horizontal sectional view taken on the line 12-12 of Fig. 11, looking in the direction of the arrows,

Fig. 13 is a fragmentary sectional view taken on the line 13-13 of Fig. 11, looking in the direction of the arrows,

Fig. 14 is a detail fragmentary sectional view of the modified form of top and end seals shown in Fig. 13, illustrating the manner of engaging these seals at their ends,

Fig. 15 is a vertical sectional view of a modified form of partition, the partition being hollow and having air inlet and outlet openings in its terminals,

Fig. 16 is a transverse sectional view of the same taken on the line 16-16 of Fig. 15, Fig. 17 is a detail fragmentary sectional view of the modified form of partition, taken on the line 17-17 of Fig. 15, looking in the direction of the arrows,

Fig. 18 is a fragmentary vertical sectional view taken through the side wall of the firing chamber, showing to advantage the heat induction and peep openings near the crown of the kiln, and

Fig. 19 is a fragmentary side elevational view of the same showing to advantage one of the roller supports for the hood.

With the device of the present invention, it is contemplated that the kiln be constructed at the source of supply for the ware to be manufactured. The present invention has, after much experiment, been worked out to a point where the clay may be loaded in cars, at the source of supply, transported into a clay preparing unit, there dumped and prepared for the ware forming apparatus, the ware being transported from the latter to the kiln floor for the final operation of setting and drying, preheating and burning. This method of manufacture is one continuous operation.

In Fig. 2, I have diagrammatically illustrated a plant as now used for the manufacture of brick in accordance with the teaching of the present invention. The plant comprises tracks 20 extending from the source of clay supply into a preparing unit 21. The clay is transported into dump cars 22, which latter are adapted to permit gravitation of the clay therefrom into engagement with a grating 23, the latter being superposed over clay preparing mechanism, generally designated 24, and including a granulator and disintegrator. The clay drops from the mechanism 24 to a belt 25, one end of which latter is positioned directly beneath the mechanism 24 in the clay preparing unit

21. The belt 25 carries the prepared clay to a ware forming unit 26 located at a point remote from the clay preparing unit. The unit 26 is circumscribed by a continuous circular kiln, generally designated 27 and shown advantageously in Fig. 2 of the drawing. The belt 25 rises up over the top of said kiln so that the prepared clay may pass uninterruptedly from the clay preparing unit 21 to the ware forming unit 26. After the ware has been formed in the unit 26, it is conveyed by a belt or the like 28 to the floor of the kiln 27.

The ware may be tiered on the kiln floor in any desired manner. I have found it preferable to arrange a predetermined number of tiers of brick in superimposed relation on the kiln floor, after which the belt or conveyor 28 is retracted and ware fed to another part of the kiln. This may be conveniently done by rotating the ware forming unit 26 so as to bring the conveyor 28 into operative proximity to the part of the kiln floor upon which the brick is next to be tiered. This operation is repeated until the desired number of tiers have been erected and the ware dried, pursuant to which the tiered ware is preheated, fired and cooled in succession in a manner more fully hereinafter set forth.

The kiln floor, indicated at 29, and illustrated to advantage in Figs. 1, 3, 4 and 5, is of circular continuous construction and perforate to permit the passage of heat therethrough. The perforations in the floor of each chamber communicate with ducts or passageways 30, formed immediately therebeneath, the ducts being also in communications with suction outlets 31 and an annular continuous flue 32. Between the outlets 31 and flue 32, damper guides 33 are positioned which are adapted for the reception of dampers 34. The dampers are available to deflect the heat, suctioned from the kiln chambers through the ducts 30, into the outlet 31.

The floor 29 is of multi-part construction, each part forming the bottom of a chamber, the latter being more fully hereinafter described. Said floor parts, one of which is shown to advantage in Fig. 5 and designated 35, are provided with tangential openings 36. These openings communicate, through openings between featherwalls 37, with the ducts 30. The featherwalls extend laterally from arches 38, each of the latter being subjacent a floor part 35 and constituting the top of one of the ducts 30. The floor parts are equipped on their upper faces with guide strips 38′ which latter are parallelly arranged on opposite sides of the openings 36. Cellular blocks 39 are slidably mounted between the guide strips, the voids in the blocks communicating with the openings 36. The tops of the blocks 39 are uniplanar with the upper margins of the strip 38′, providing a relatively smooth uninterrupted surface upon which the brick are tiered.

The kiln floor 29 is provided, at intervals, with partitions 40 which co-act with hoods, generally designated 41, to provide chambers. Preferably, these chambers are arranged in batteries of four, as illustrated in Fig. 1 of the drawing. Each battery consists of a setting and drying chamber S-D, a preheating chamber D, a firing chamber F and a cooling chamber C. The hoods are equipped with rollers 42 which are mounted on tracks 43, the tracks extending around the kiln, on both sides of the kiln floor 29. This permits the hoods to be moved with facility, at the option of the operator.

The hoods, with the exception of the firing hood 44, are of substantially uniform construction. In this hood firing openings 45 are formed near the crown of the hood. Through these openings the heating gases are induced for impingement against brick tiered in this chamber. Peep or sight openings 46 are also formed at intervals in this hood. A suitable operator supporting platform 47 is mounted on each side of the firing hood. The platforms are fixedly secured to the hood in convenient accessibility to the openings 45 and 46. If desired, each side wall of the firing hood may be extended inwardly, at its lower extremity, to provide a rib 48 which complements and is engageable in a groove 49 formed in the side of the kiln floor base. By this construction a bottom seal is provided to better retard the escape of heating gases from the chamber. It has also been found advantageous to append a flange 50 from the bottom margin of each side wall of the hoods. These flanges, as shown to advantage in Fig. 6, extend into sand beds 51 thereby providing sand seals between the chamber floors and hoods.

Additionally, to prevent the escape of the heating gases from the chambers, suitable movable seals are provided which are adapted for engagement with the free marginal edges of each of the partitions 40. These seals may consist of fire brick columns, providing end seals 52 and top seals 53. The end seals may be supported by suitable roller mechanism 54, which latter is carried by the hoods. This mechanism permits free lateral movement of the end seals into engagement with and out of engagement from the partitions.

Preferably the ends of the partition are provided with median grooves 55 of a width sufficient to accommodate the free margins of the end seals. This permits nesting of the seals in the partitions and forms a gas tight joint between the partitions and hoods, which construction is especially desirable where pressure chambers are employed. The top seal 53 pends through an opening 56 in the hood crown, the seal being supported by a beam 57 mounted on said hood crown. An adjustable bolt 58, carried by the beam 57, is engaged with the top seal for controlling movement of the latter.

If desired, instead of employing a solid partition wall, an air space may be formed centrally in the latter, as shown in Figs. 11 to 16, inclusive. In this form of invention, the partition designated 40′ is open, as indicated at 59, through the center from top to bottom as well as from end to end. The walls of the opening are contracted at the top and has a mouth 60 issuing therefrom. The mouth is adapted for engagement in a slot 61 formed centrally in a top seal 53′. Except for the slot 61 this top seal is of the same construction as the seals 53. In a partition wall of this construction it is preferred to permit air to enter the space 59 from the bottom, at one end of the wall. In Fig. 15, I have shown an air inlet opening 62 which communicates with a channel 63 in the bottom of the wall. Preferably spacers 64 are mounted at intervals between the walls of the air space, the spacers being arranged vertically and extending from the top to the bottom of the wall. The air passing up through the wall is vented to the atmosphere through the mouth 60 and slot 61. In this form of invention both the end and top seals have their free ends countersunk in complemental recesses 55′ formed in the ends and top of the partition. Furthermore, the bottom of each recess is equipped with mineral wool 65 or similar fireproof packing to effect a positive seal between the hood and partition. The top of the end seal is provided with packing 66 which engages the inner walls of the top seal, on the opposite sides of the slot 61, as shown in Fig. 14.

By use of the dampers 34 in the ducts 30 and 67 in the flue 32, a flexible system of transferring heat from one chamber to another is provided. It is possible, with this system, to operate a single chamber, if that should be found feasible and it is likewise possible to operate two or more of the chambers simultaneously. One or more chambers may serve to constitute a kiln; four being used at X; three at Y; and one at Z. It is thus seen that the continuous kiln 27 can in practice be used as three separate kilns at one time. Furthermore, by introducing the heat at the top of the firing chambers and causing it to be withdrawn through the floor of the chambers and then baffled into the chamber or chambers desired, transfer of heat is at all times within the complete control of the operator. In addition to the suction openings 31, in each of the ducts or tributaries leading to the flue 32, said flue is provided with corresponding openings 31′ arranged in proximity to the dampers 67 and in which the suction fans 68 are engageable, as illustrated in Fig 1. It is, of course, understood that as many of the suction fans 68 as desired may be simultaneously employed. The fans are portable and compact so as to be easily and quickly moved by manual power for application to the various suction openings.

Also upon reference to Fig. 1 of the drawings, it will be observed that the ware transporting belt 28 is positioned in one of the set and dry chambers. When in this position the flue dampers 67 are open from the cooling chamber on the opposite side of the kiln. This permits the suction of gases under influence of a suction fan 68, from said cooling chamber to said set and dry chamber, as indicated by the arrows. The hood for the set and dry chamber, is presently moved to the right, pending complete tiering of the brick. Upon completion of the tiering operation the ware transporter is retracted on a track 69 in the ware forming unit 26, pursuant to which the set and dry hood is moved into position over the tiered brick and the gases from the cooling chamber forced through the tiers of brick in the set and dry chamber. During this period the preheating chamber is receiving the hot gases from the adjacent firing chamber by reason of the fact that the suction fan for the preheating chamber is in operation and the flue damper between the firing and preheating chambers is open while the flue dampers at the ends of the firing and preheating chambers are closed. It is now manifest that the heated gases induced into the firing chamber through the openings 45 are withdrawn by the suction fan of the preheating chamber and circuited into said preheating chamber. The products of combustion from the preheating chamber may be vented through an opening in the crown of the hood or in any other conventional manner.

Operation of a plant and method in accordance with the teaching of the present invention has proven speedier in operation with consequent increase in manufacture and an improved ultimate product. The arrangement of the kilns, movability of the hoods and flexibility of transfer of heat insures uninterrupted operation of the plant.

It is of course to be understood that various changes may be made in the details of description, proportion and arrangement of parts within the scope of the claims hereto appended.

WHAT IS CLAIMED IS:

1. A kiln for use in the manufacture of brick and other clay products including a kiln floor divided into a plurality of brick treating zones each of which is provided with openings for heat induction, hoods arranged in batteries, each battery being engageable over a series of adjacent zones, the ends of the hoods being closed to provide chambers for the brick tiered on the kiln floor in said zones, firing means included in one chamber of each battery, and means for circuiting the heat from said firing chamber to the heat induction openings in the floor of another battery of chambers.

2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a

plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.

3. In combination with an annular multi-part kiln floor provided with heat passageways, an annular heat conducting flue centrally of said kiln communicating with the kiln floor passageways, and controllable means in said flue arranged for intercircuiting of heat between said multi-part floor and flue.

4. A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.

5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

6. A brick kiln including a continuous kiln floor, partitions arranged at intervals on said floor hoods movable mounted on opposite sides of the floor, arched over the floor and partitions and engageable with the latter.

7. A brick kiln including a continuous kiln floor, partitions arranged at intervals on said floor, hoods arched over the floor and partitions, and movable on the floor for optional positioning over the partitions.

8. A brick kiln including a floor equipped with partitions, hoods mounted on the floor and movable thereover, and seals mounted in the hoods and movable into engagement with said partitions.

9. A brick kiln including a floor and relatively movable hoods arched over the floor, certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.

10. Same as claim 9 with the addition of mechanical suction means for withdrawing the inducted heat from the kiln through openings in the floor of the latter.

11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

12. Same as claim 11 in addition to dampers positioned at predetermined intervals in said flue, to permit heat transfer from one chamber to another, proximate or remote, at the option of the operator.

13. A brick kiln comprising a floor, walls arranged at intervals on the floor, hoods movably mounted on said floor, the hoods including means operable into engagement with the free margins of the walls to form seals.

14. A method of making brick which consists in tiering the ware in a closed chamber the floor of which is perforate, impinging the ware from the top with heating gases, and then withdrawing the gases through the bottom of the chamber.

15. A method of making brick which consists in connecting chambers in series and tiering green ware on the

floors of the chambers, impinging upon the ware in one chamber of the series from the top thereof a heating medium, withdrawing the latter through the bottom of the chamber, and then transferring the heating medium to an adjacent chamber and impinging it against the ware of the latter chamber through its floor.

16. A method of making brick consisting of connecting two or more series of intercommunicating chambers, inducting heating gases into the top of one chamber of each series for impingment with ware tiered on the floor thereof, the gases being withdrawn from each chamber through its floor and then transferred and retransferred to other chambers of each series.

17. A method of making brick in a continuous operation comprising transporting clay from its source to a clay preparing unit and conveying the prepared clay to a ware forming unit, the green ware being transferred from the forming unit to a predetermined part of the floor of a kiln where it remains during the following steps of drying, preheating, firing and cooling in consummating manufacture.

18. Apparatus for making brick comprising a continuous annular multi-part floor, each of the parts having openings, (a) flue mounted within the confines of the floor, a duct leading from the opening of each floor part to and in communication with the flue, means for encasing each part to provide brick treating chambers, and means selectively communicable with said chambers and also in communication with said flue for withdrawing heat from the chambers and transferring it to the flue.

19. A kiln including a floor, and a hood portably mounted on the floor and rising upwardly from the latter to a height sufficient to envelop ware tiered on the floor.

20. A kiln for use in the manufacture of brick including a continuous circular floor, walls arranged at intervals on the floor, a rail mounted in the floor on each side of the walls, hoods arched over the floor and walls and engaged with said rails to permit selective engagement of the hoods with the walls.

JOHN R. CLARK,
Inventor.

OATH

District of Columbia, ss.:

JOHN R. CLARK, being duly sworn, deposes and says that he is a citizen of the United States and resident of Bethesda, Maryland; that he verily believes himself to be the original, first and sole inventor of the improvements in a

KILN FOR BRICK AND OTHER CLAY PRODUCTS described and claimed in the annexed specification; that the present application is in part a continuation of an application filed by him in the United States Patent Office on November 6, 1936, Serial No. 109,597; that as to the subject matter common to the present application and to said application, Serial No. 109,597, he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than one year prior to the date of filing said application, Serial No. 109,597, or in public use or on sale in the United States for more than two years prior to said date; that said invention has not been patented to himself or to others with his knowledge and consent in this or any foreign country for more than two years prior to the date of the filing of said application, Serial No. 109,597, or on an application for a patent filed in any country foreign to the United States by himself or his legal representatives or assigns more than twelve months prior to said date; and that no application for patent on said improvement has been filed by himself or his representatives or assigns in any country foreign to the United States; that as to the remaining subject matter he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented to himself or to others with his knowledge or consent in this or any foreign country for more than two years prior to this application, or on an application for a patent filed in any country foreign to the United States by himself or his legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvement has been filed by himself or his representatives or assigns in any country foreign to the United States.

JOHN R. CLARK.

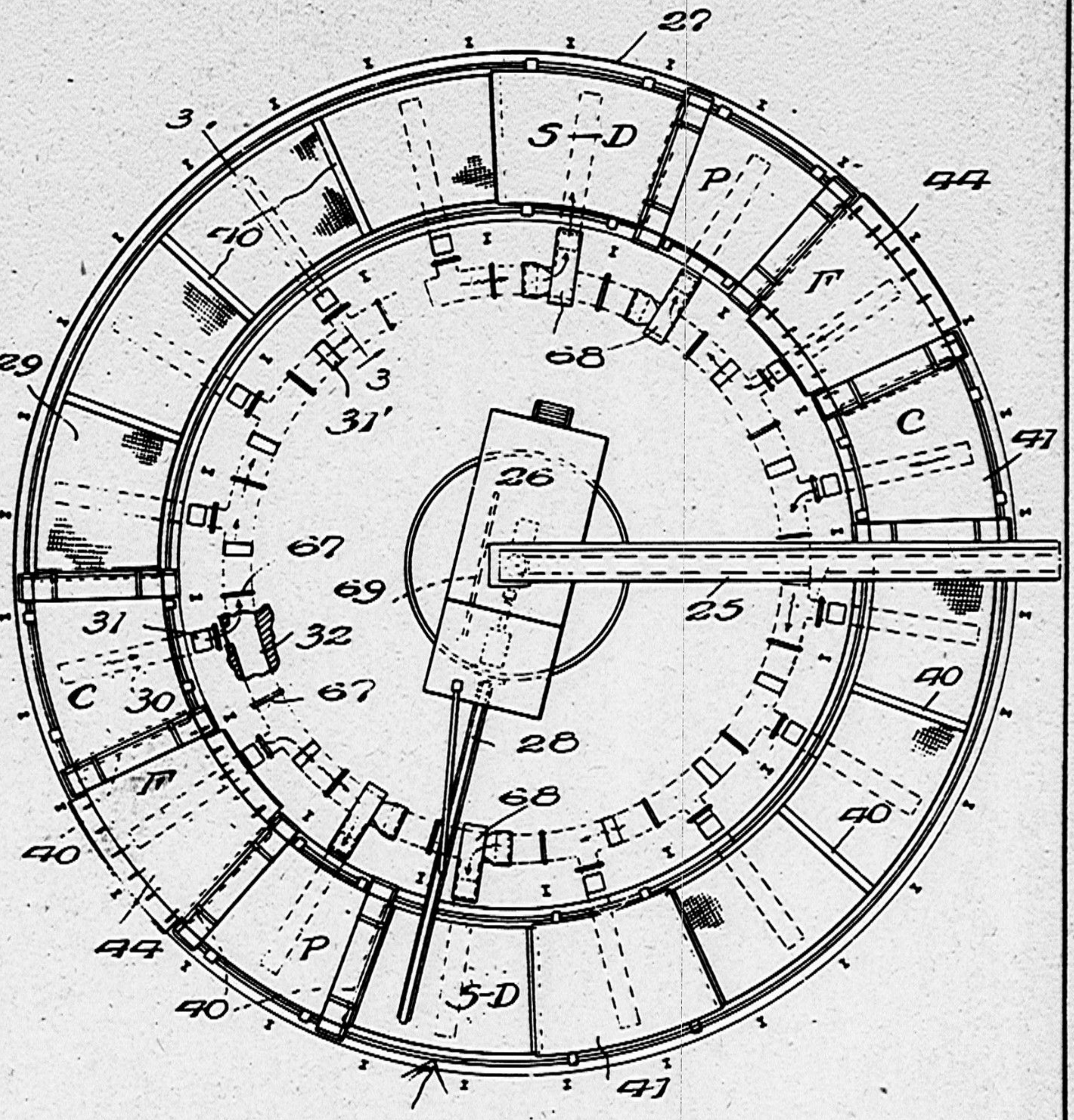
Subscribed and sworn to before me, a notary public, this 9th day of March, 1939.

FREDERICK A. THUEE,
Notary Public, D. C.

My commission expires 9/30/40.

(Seal)

Fig. 1.



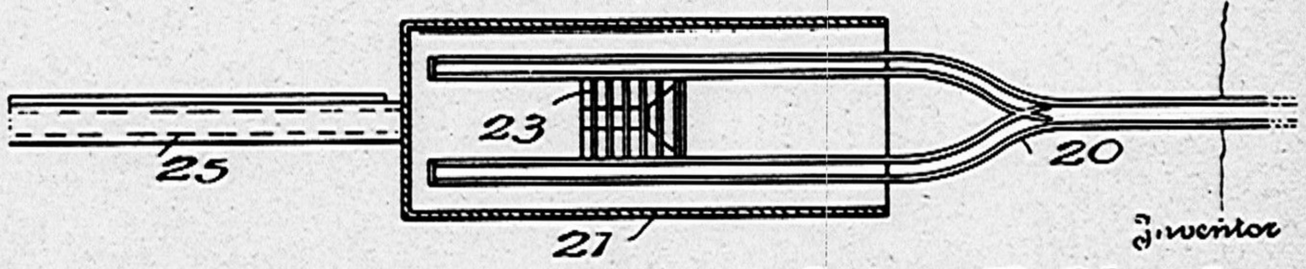


Fig. 1a.

Inventor

John R. Clark,

⑱

By Bernard J. [illegible]

Attorney

Fig. 2.

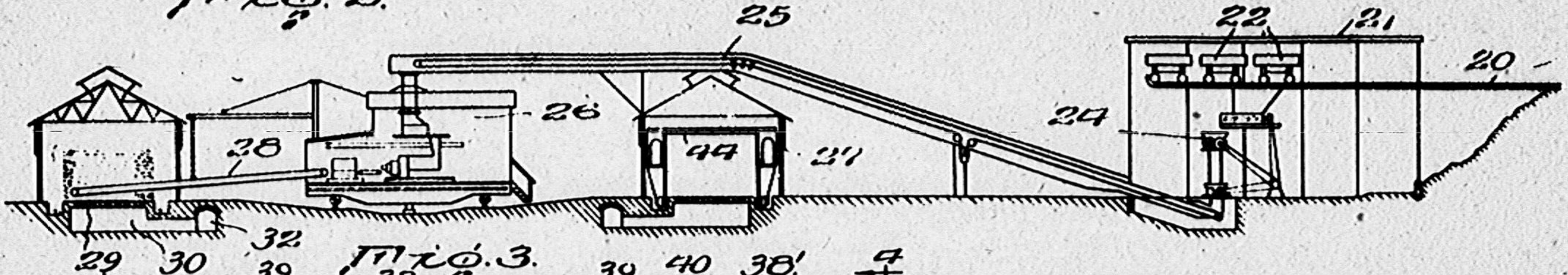
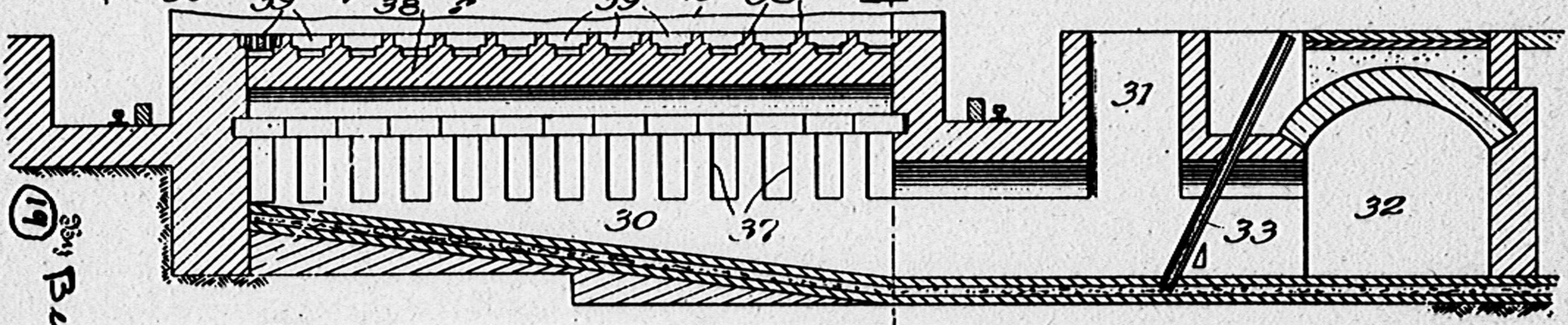


Fig. 3.



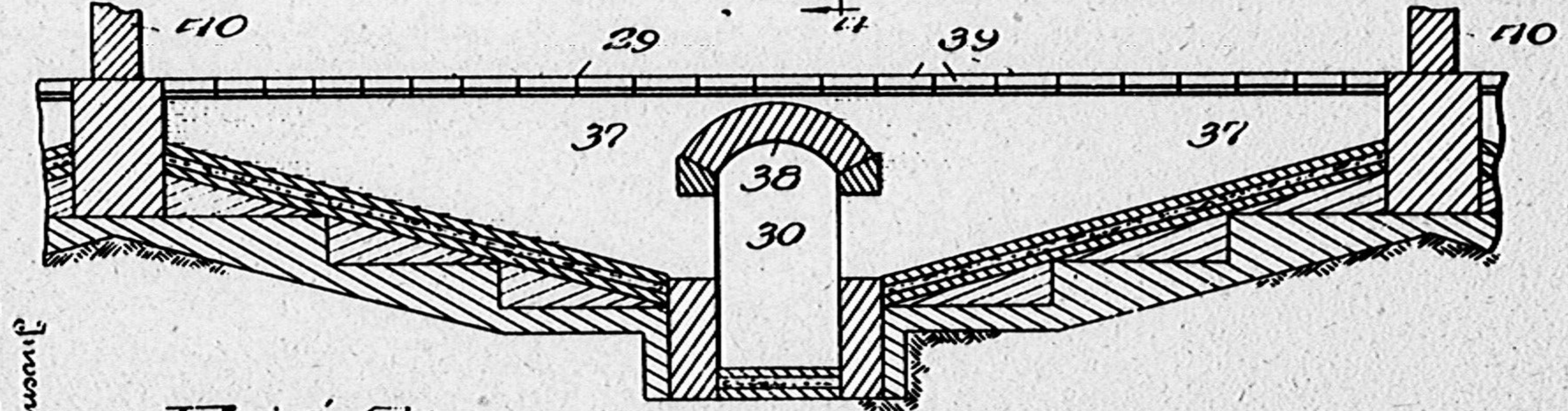


Fig. 4.

Inventor

John R. Clark.

(19) By Bernard F. Garvey

Attorney

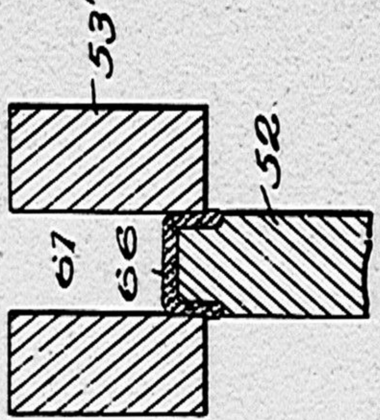


Fig. 14.

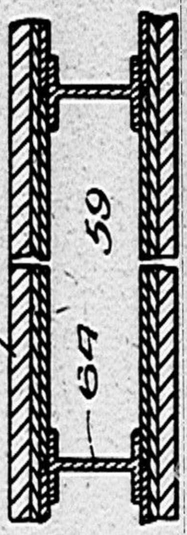


Fig. 12.

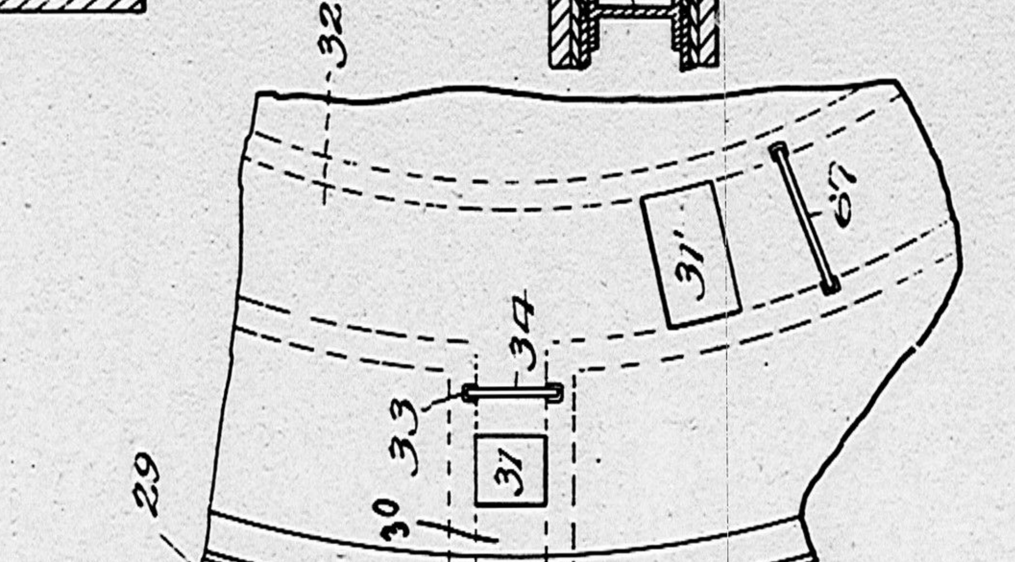


Fig. 5.

Inventor

John R. Clark,

By Bernard J. Garvey

Attorney

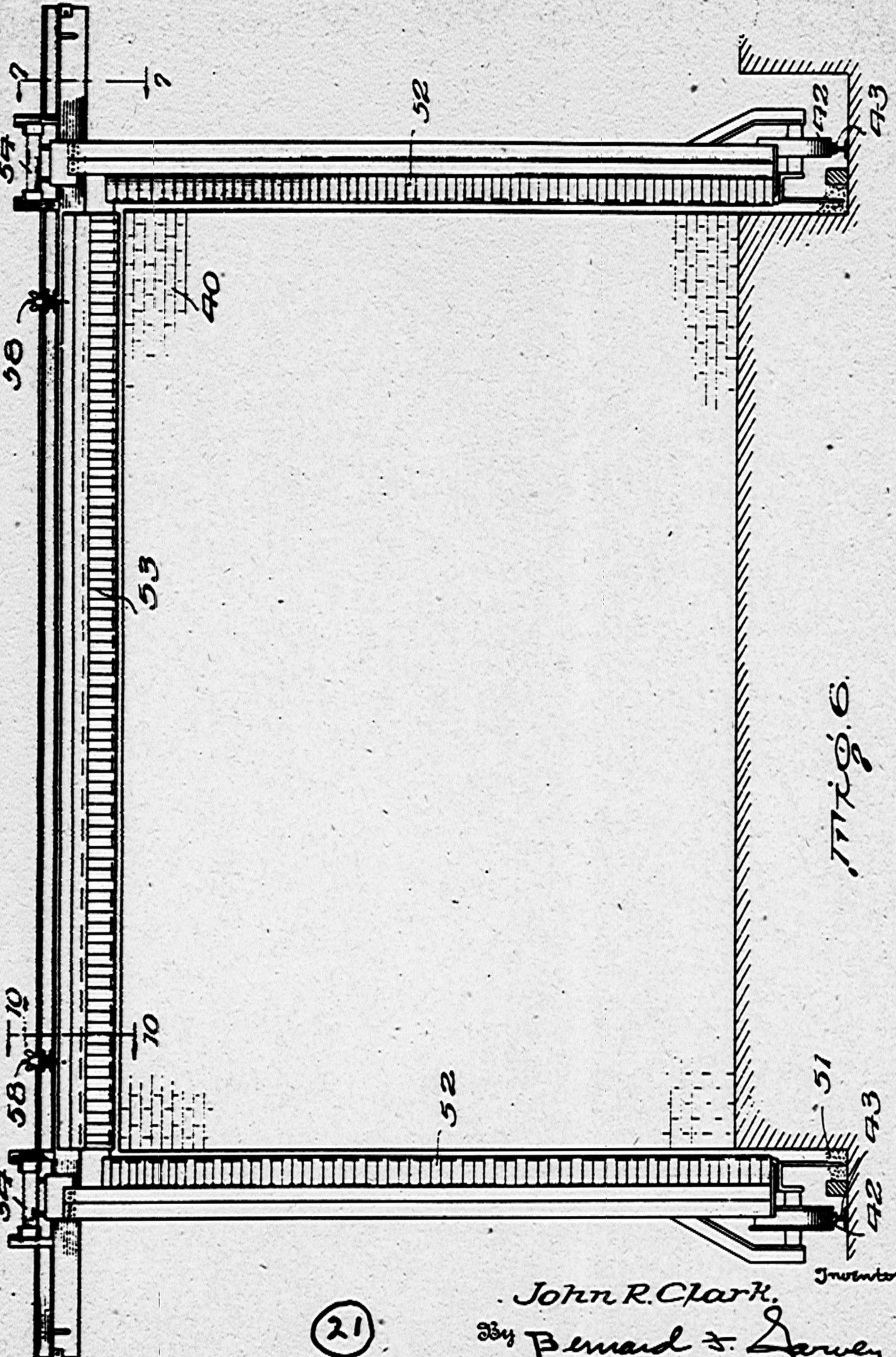


Fig. 6.

Inventor

John R. Clark.

By Bernard J. Garvey

Attorney

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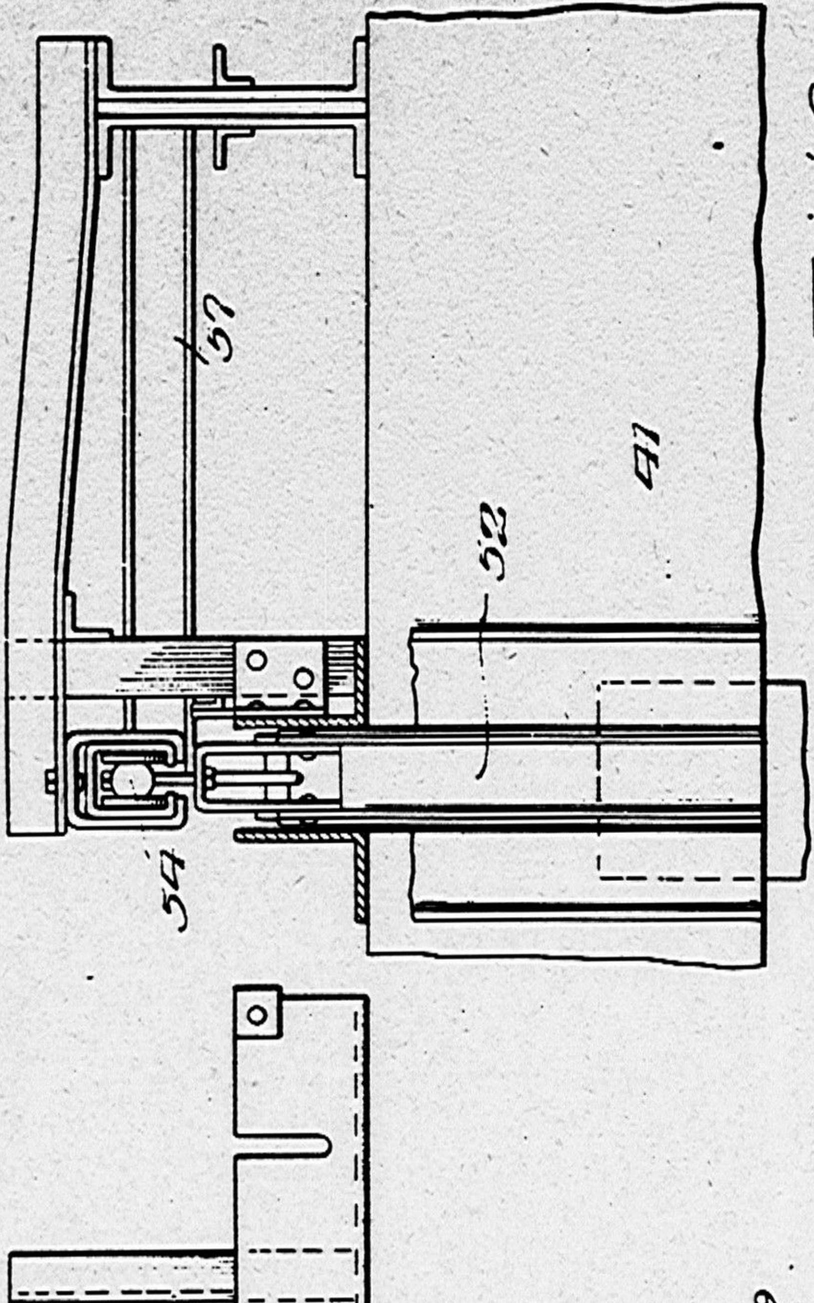


Fig. 8

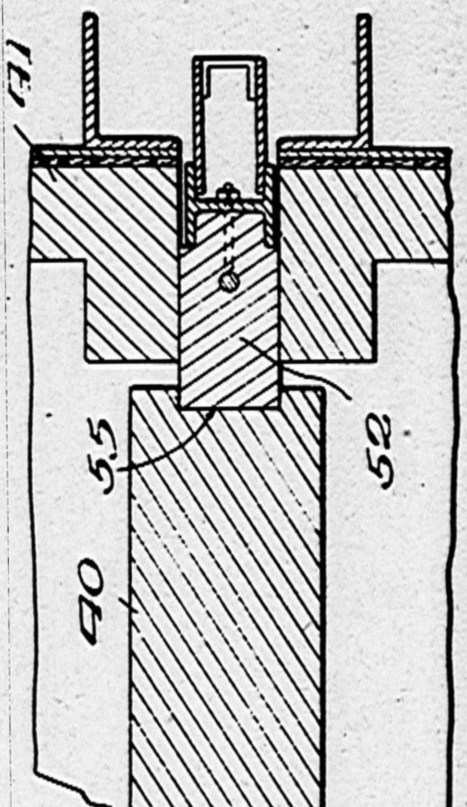


Fig. 9

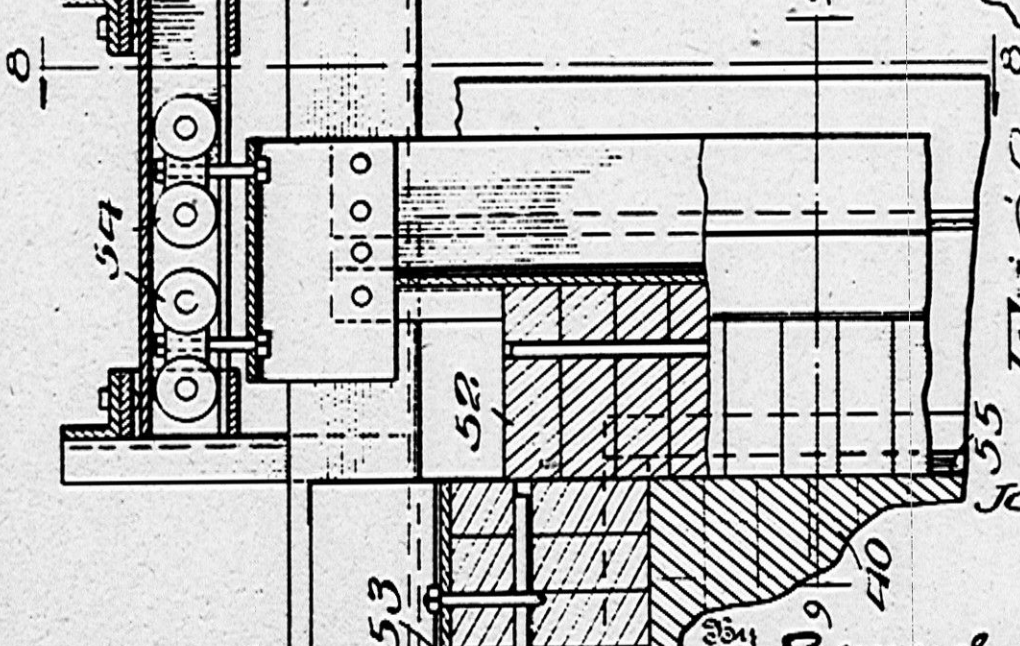


Fig. 7

Inventor

John R. Clark.

By Bernard F. Garvey

Attorney

(22)

Fig. 11

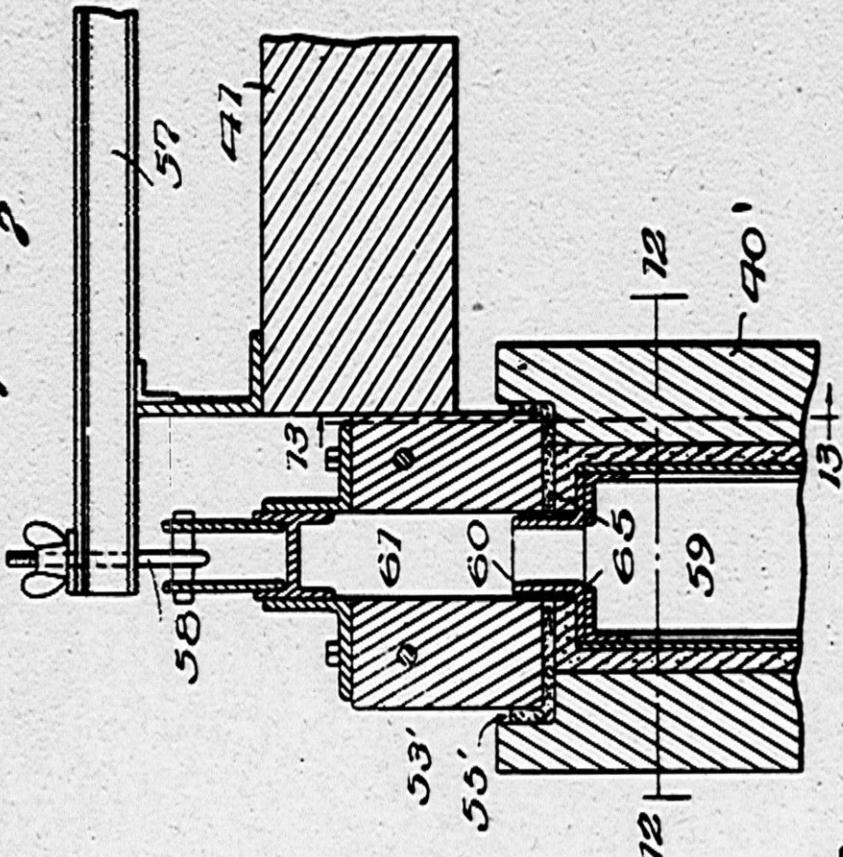


Fig. 13

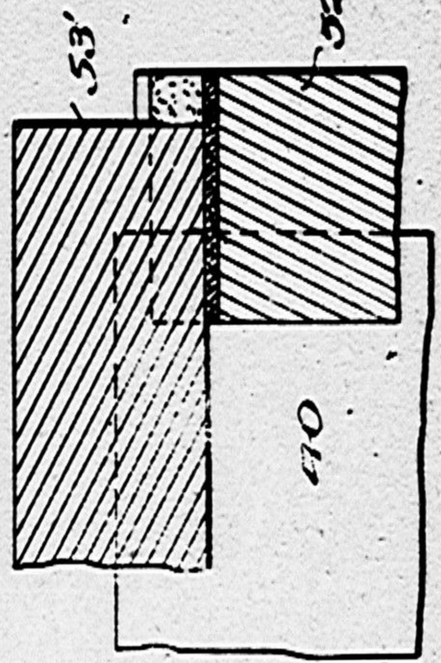


Fig. 10

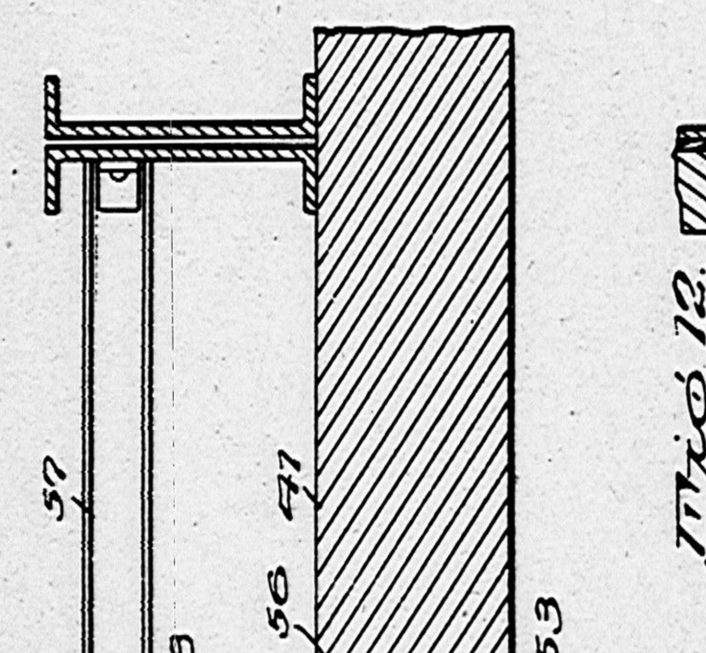
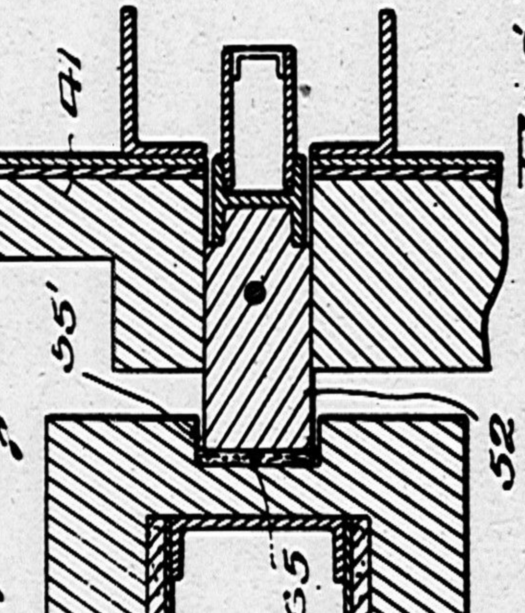


Fig. 12



Inventor

John R. Clark,

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By Bernard J. Garvey

Attorney

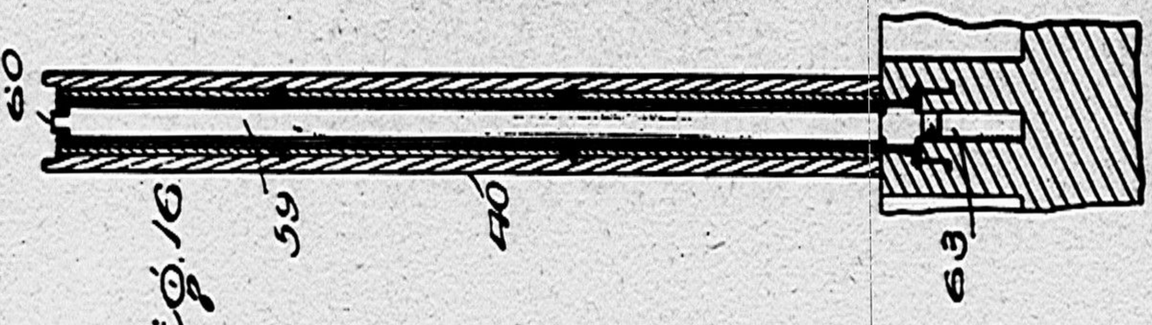

Fig. 16

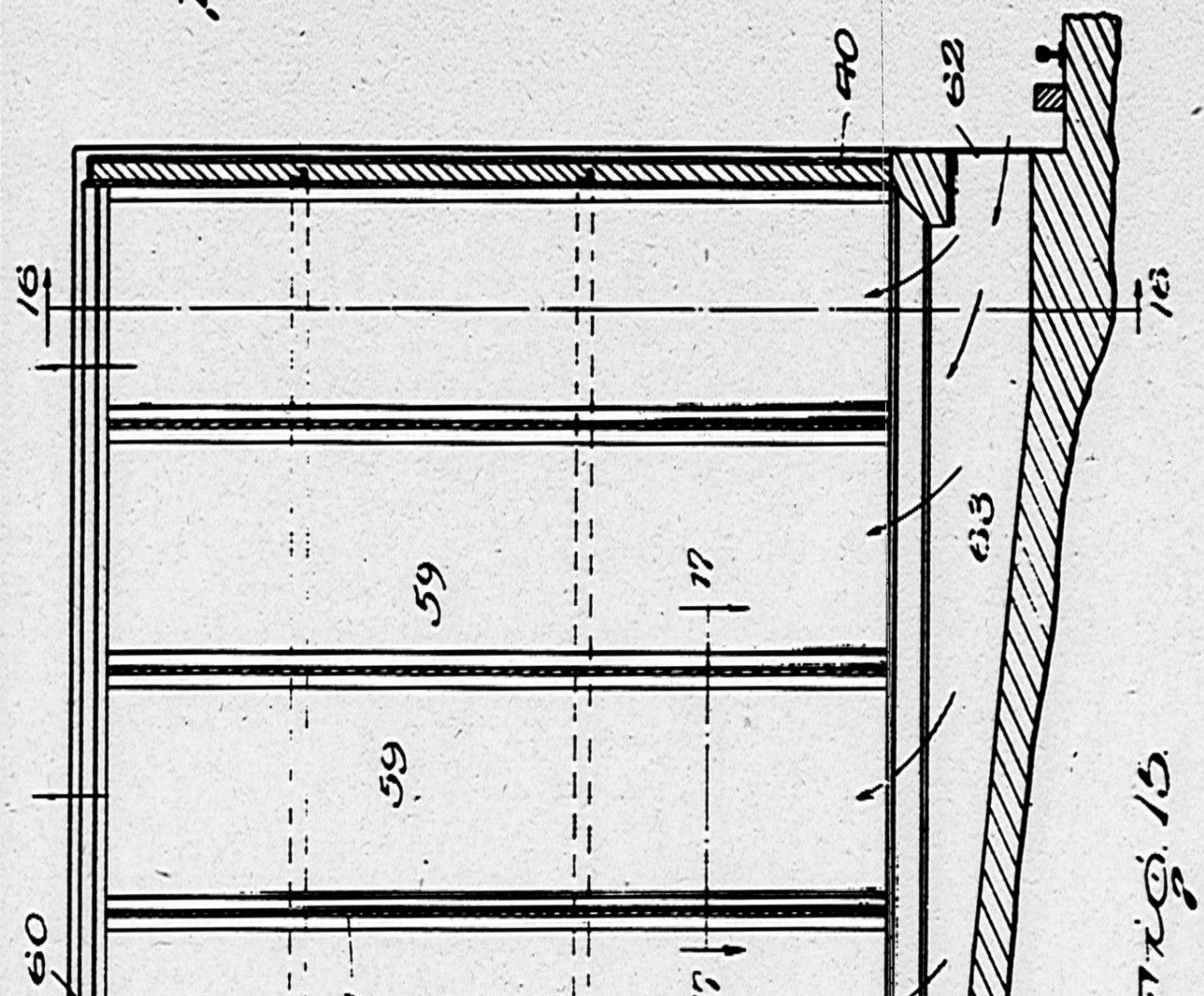

Fig. 15

Inventor
John R. Clark,

㉔

By Bernard F. Garvey
Attorney

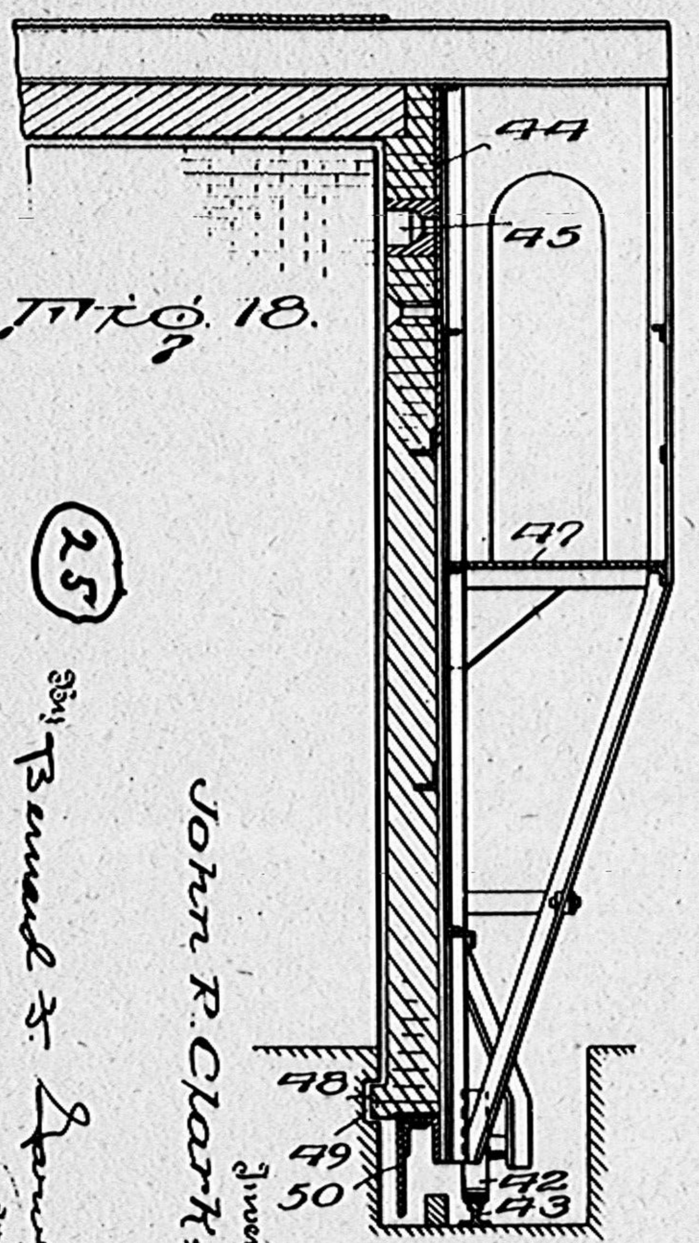

Fig. 18.

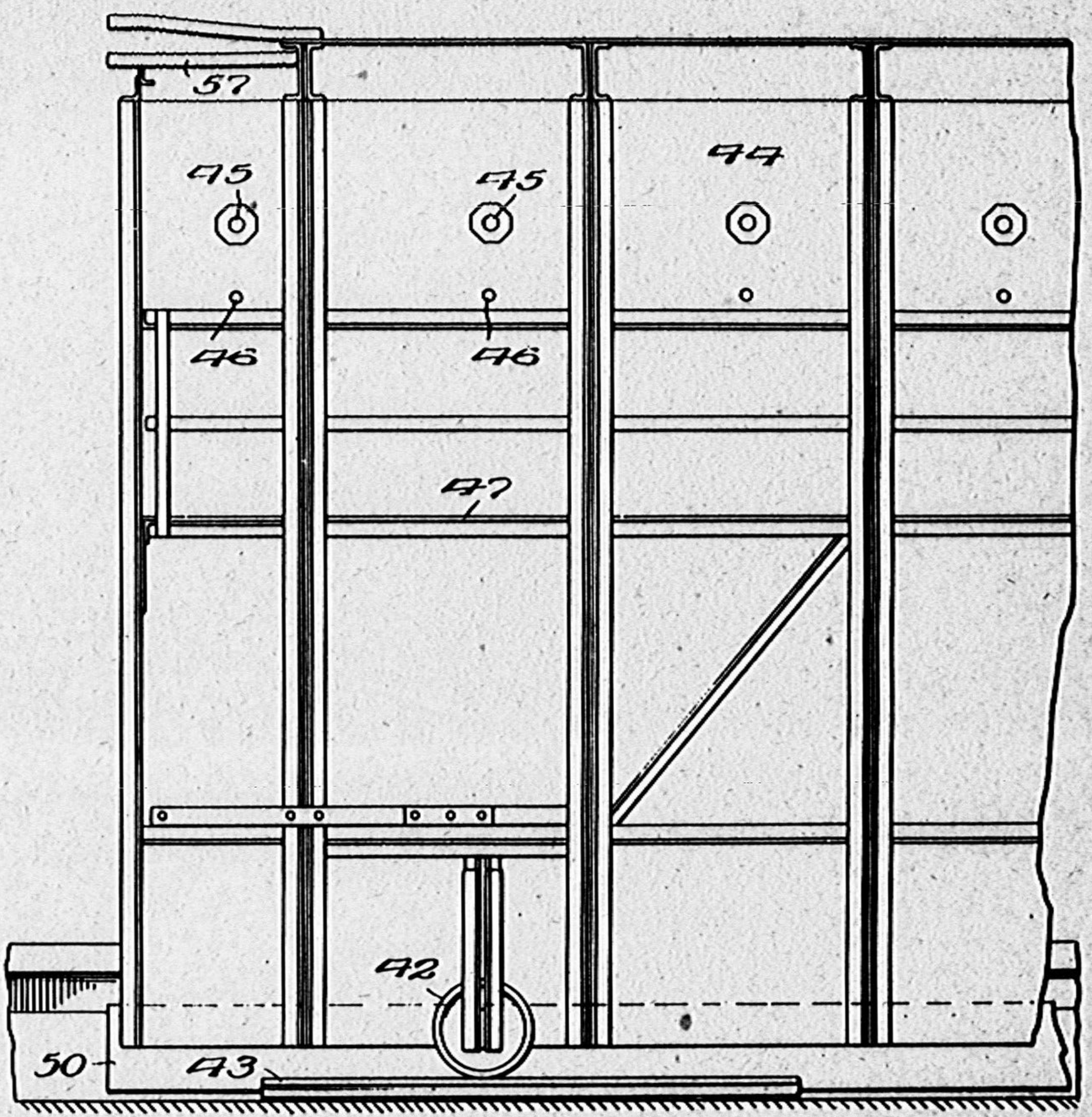

Fig. 19.

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Inventor

John R. Clark,

By Bernard J. Garvey

Attorney

DEPARTMENT OF COMMERCE.

UNITED STATES PATENT OFFICE.

Washington, D. C.

Examiner's Statement.

This is in answer to an appeal from the final rejection of claims 2-5, 9, 11 and 21. Claims 1, 6-8, 13, 15, 20 and 22-25, have been indicated as allowable. These are all of the claims now in the case.

The appealed claims read as follows:

> 2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.
>
> 3. In combination with an annular multi-part kiln floor provided with heat passageways, an annular heat conducting flue centrally of said kiln communicating with the kiln floor passageways, and controllable means in said flue arranged for intercircuiting of heat between said multi-part floor and flue.
>
> 4. A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.
>
> 5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

9. A brick kiln including a floor and relatively movable hoods arched over the floor certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.

11. A brick kiln including a perforate kiln floor partitioned at intervals, hoods arranged over parts of the floor and engageable with said partitions, to provide chambers, certain of said hoods having openings near their crowns for the passage of heat therethrough for impingement with ware tiered on the kiln floor, a flue communicating with each chamber through the floor perforations, and suction means mounted in said flue and operable to draw the heat through the ware and through the floor perforations into the flue.

21. A brick kiln including a fixed floor with openings therein, relatively movable hoods arched over said floor, certain of said hoods being provided with heat induction openings adjacent their crowns, whereby to permit impingement of heat with ware tiered on the kiln floor from a point above the ware, and suction means arranged to be placed in communication with any of said openings to withdraw inducted heat from the kiln through the openings in the floor of the latter.

The invention relates to a circular kiln and plant layout in which ceramic ware, manufactured within the kiln circle, is delivered from the center of the kiln circle to the various kiln sections being set. The kiln floor, which is of the conventional check or perforate type, is divided into sections by fixed partition walls which extend radially. Over these sections and partition walls brick lined hoods are movable. These hoods cover at least one section of the floor. Generally they include three sections, a drying and water-smoking, burning and cooling section. One or more groups of hoods may be operated simultaneously around the kiln circle. The movable hoods are supported on a circular track which is carried by the floor foundation. There is an annular flue within the kiln circle which has appropriate flue connections to each kiln floor section. This flue is equipped with slide dampers by means of which the hot gases may be independently circulated from the burning kiln and the cooling sections for water-smoking and drying respectively. Circulation of the different gases is by means of power driven suction fans.

The ware (in this case brick) is extruded and wire cut by conventional equipment mounted on a turn table at the center of the kiln circle. The ware is conveyed from this point radially to the kiln floor section being set. By rotation of the turn table, the setting operation is moved from section to section.

Burning is accomplished by introduction of the flame from oil burners near the top of the burning hood section in the down draft system. The products of combustion are taken out through the floor of this section and are conducted under the perforate floor of the next or water-smoking and preheating chamber, from which they are discharged to the atmosphere.

Outside air is drawn through the cooling ware and is conducted through the set ware for the purpose of drying.

The references relied on:

Guthrie	215,606
Fiske	633,955
Kleymeyer	1,913,599
Knacker	511,704
Swiss patent	162,939

The Guthrie patent discloses a plant layout comprising a fixed annular kiln at the center of which from a molding machine mounted on a rotary turn table, ware is conveyed to the kiln chamber being set.

The Fiske patent discloses a battery of kiln chambers which are below floor level which (chambers) are covered by a portable kiln crown. cf. Figures 3 and 4. The kiln chambers may be grouped and fired down-draft thereby making the operation continuous.

The Kleymeyer patent shows a grouping of round down-draft periodic kilns with an appropriate flue system for continuous operation. Figure 3 shows, in particular, a vertical cross-section in which the checker floor, mid-feather walls and gathering flue are readily apparent.

The Knacker patent shows an annular kiln adapted for the conventional continuous operation in which the firing zone moves around the circle of the kiln. The fuel burners are located in the crown of the kiln. The products of combustion impinge directly on the ware as they move downwardly through the ware.

The Swiss patent discloses a method of firing ware in which a portable hood is moved over set ware and the latter is then matured by the application of heat thereto.

Claim 2 was rejected as being met by the patent to Guthrie. This reference discloses the combination, in a plant layout, of an annular kiln with production equipment located at the kiln center on a rotary turn table. The particular type of kiln does not confer patentability on the combination under the doctrine of *In re* McNeil, 1902 C. D. 563, 100 O. G. 2178.

Claim 3 was rejected as being substantially met by the patent to Guthrie. While the gathering flue in this reference is not completely annular and is located circumferentially of the kiln, the structure is equivalent to that of the applicant as herein defined. There is apparently no functional advantage in the relative location of this flue.

Claims 4 and 5 were rejected as being met by either the patent to Fiske or the Swiss patent. Fiske discloses the equivalent of an annular series of kiln chambers in which the crown is moved from chamber to chamber. The Swiss patent discloses a setting floor consisting, in the patent, of only two positions, and a portable hood which is placed alternately over the fixed settings. There would be no invention involved in arranging these setting positions in a circle and in moving the hood from position to position if it were desired to do so.

Claims 9 and 21 were rejected as being met by the patent to Fiske in view of that to Knacker. In the Fiske kiln the products of combustion impinge on the top of the ware and flow in a down-draft direction. There would therefore be no invention required to introduce the heating medium through the crown of the Fiske kilns in view of the teaching of Knacker, if it were desired so to do.

Claim 11 stands rejected as not being patentable over the patent to Fiske, in view of that to Kleymeyer. The portable crowns of the Fiske patent are the functional equivalent of applicant's portable hoods. There would be no invention required to substitute the conventional perforated kiln floor for the type shown by Fiske in view of the disclosure of the Kleymeyer patent. This type of kiln floor is old in the art of kiln structure as indicated by Kleymeyer. *c. f.* Figure 3.

B. HENKIN,
Examiner.

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte John R. Clark

Application for Patent filed March 22, 1939, Serial No. 263,507. Kiln for Brick and Other Clay Products.

Mr. Bernard F. Garvey for applicant.

This is an appeal from the final rejection of claims 2 to 5, 9, 11 and 21.

Claims 2, 4 and 9 are illustrative.

> 2. A kiln for use in the manufacture of brick and other clay products including a continuous circular kiln, a plurality of hoods arched over a sector of the kiln, each hood being movable for positioning over any part of the kiln, a turn table mounted within the confines of the kiln, ware forming mechanism carried by the turn table, means to feed the prepared clay to said mechanism, and means to transport the ware from said mechanism to the kiln, the transporting means being movable with the turn table.
>
> 4. A brick kiln including a circular multi-part kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.
>
> 9. A brick kiln including a floor and relatively movable hoods arched over the floor certain of the hoods being provided, near their crowns, with heat induction openings to permit impingement of heat with ware tiered on the kiln floor, from a point above the ware.

The references relied upon by the examiner are as follows:

Guthrie	215,606	May 20, 1879
Knacker	511,704	Dec. 26, 1893
Fiske	633,955	Sep. 26, 1899
Kleymeyer	1,913,599	Jun. 13, 1933
Swiss Patent	162,939	Jul. 31, 1933

The appealed claims relate to a brick making plant and to parts thereof. Briefly, applicant provides a brick firing kiln of the continuous type comprising an annular arrangement of a series of compartments separated from each other by fixed radial partitions 40. A hood structure comprising top and sides is movable progressively over the fixed partitions as setting, firing, cooling and removal of the bricks progresses around the annulus. A brick molding machine is provided upon a turntable concentric with the annular kiln structure. Bricks produced by the machine are conveyed into the compartments progressively and clay for forming the bricks is fed to the machine by an overhead conveyor extending from outside of the annulus. The general plan of a brick plant of this type including annular arrangement of firing compartments, a brick machine mounted upon a turntable at the center of the annulus and with clay feeding and brick conveying means all fully equivalent generally to the corresponding features of applicant's plant is disclosed by Guthrie.

Claim 2 has been rejected as not differing patentably from Guthrie. It may be noted that claim 2 requires that the kiln section of the plant comprise a plurality of hoods. This differs from Guthrie's particular structure of kiln in that Guthrie's annular kiln is built of fixed or permanent structure rather than movable parts such as disclosed by applicant. It seems that claim 2 should be fairly considered as directed to a brick making plant as a whole and the question is presented whether the detail of kiln structure is fairly dependent upon and productive of any new or unobvious result when considered in connection with the combination as a whole. As to this point we are convinced that within the requirements of claim 2 as a general combination it becomes immaterial whether the annular kiln be of one type or the other as so broadly developed. So far as shown, it seems not patentably important or to produce any new or unobvious result whether the kiln be of one of these types or of the other. We must accordingly affirm the holding by the examiner that claim 2 does not present invention over Guthrie.

Claim 3 has also been rejected as being substantially met by Guthrie. The examiner, however, admits that Guthrie does not disclose a completely annular flue and it appears that the section of flue shown by Guthrie is not placed centrally of the kiln chambers as shown by applicant. It is our opinion that these features which appear to be material and apparently result in improvement in this relation cannot be ignored. The rejection of claim 3 is not affirmed.

Claims 4 and 5 have been rejected as being met by either Fiske or the Swiss patent. These claims are directed to a kiln of the continuous type or specifically of the circular type with movable hoods cooperating with the fixed parts such as the floor. The provision of movable walls for a brick kiln of the continuous type is shown by Fiske. While Fiske discloses only a movable top wall such as shown in Fig. 3 over kiln chambers positioned within a excavation in the ground but arranged for the continuous principle of operation, it is considered that so far as developed in claims 4 and 5, no patentable difference appears to apply whether the movable wall is a flat top or possibly of more limited structure implied by the term "hood". However, the Swiss patent discloses in Fig. 3 a structure comprising combined top and sides properly termed "a hood" within the more limited meaning. We find no inventive matter presented by the terms of claims 4 and 5 over the state of the art.

Claims 9 and 21 have been rejected as not presenting invention over Fiske in view of Knacker. These claims require rather broadly heat inductive openings to be provided near the tops of the hoods or crowns for purpose of furnishing heat to fire the bricks and particularly in claim 21 that draft openings be provided in the bottom or floor of the kiln for the escape of products of combustion. The patent to Knacker clearly discloses introduction of heat at the top of a kiln and eduction of products of combustion at the bottom or through the floor. We see no new or unobvious result produced by broadly providing openings through the movable wall A of Fiske for insertion of burners such as shown by Knacker in place of means or port a^3 shown by Fiske for introduction of heat near the top and passages a^6 for eduction of products of combustion at the bottom.

Claim 11 is found satisfied by associating the rather broad conception of partitions of the kiln structure and movable cover of Fiske with bottom flues such as shown by Kleymeyer. The rejection of this claim on the ground that substitution of the bottom type of eduction such as broadly shown by Fiske by the rather more specific bottom eduction structure of Kleymeyer regarded as equivalent so far as defined, produces no new or unobvious result and is considered not to present patentable invention, is warranted.

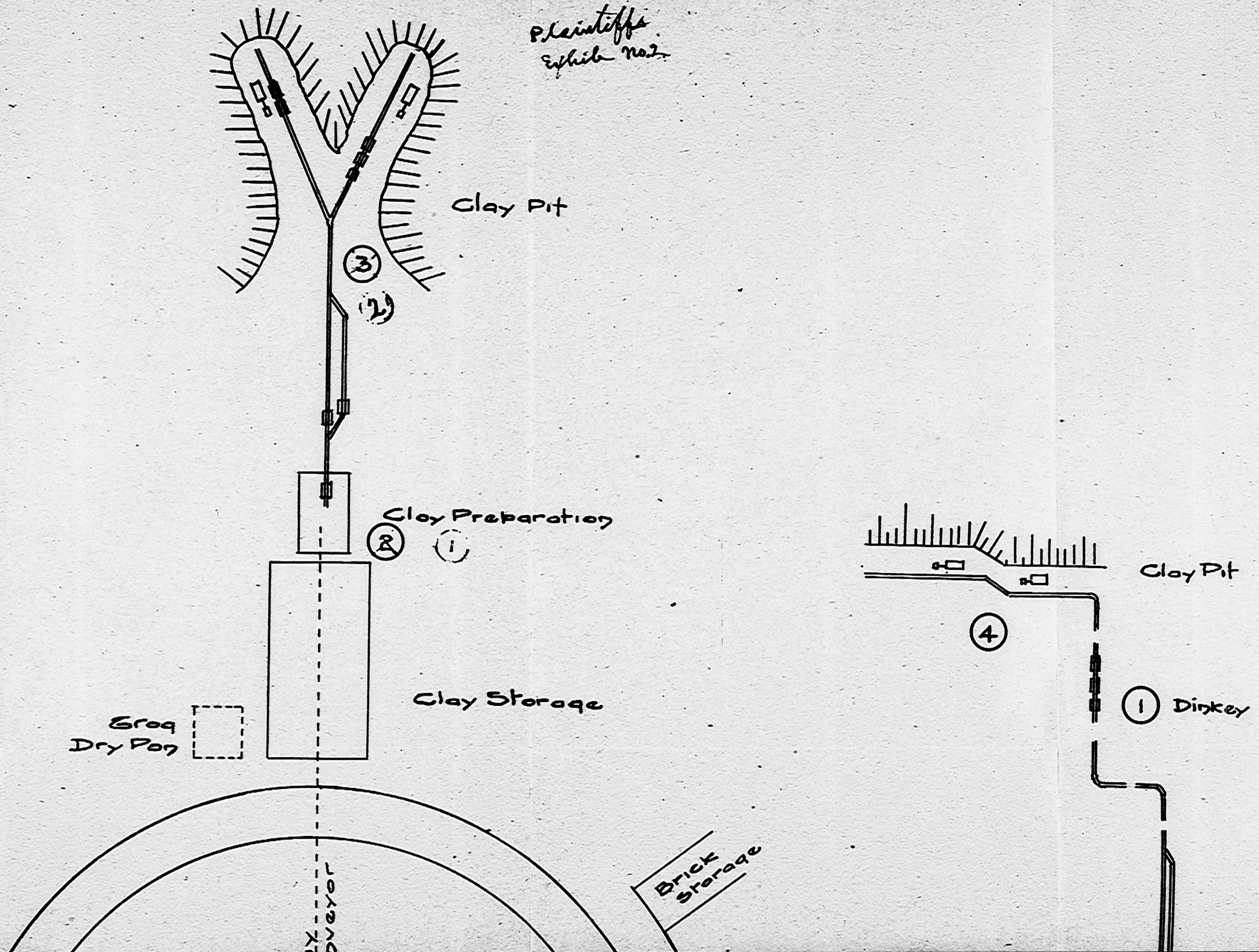
The decision of the examiner is reversed with respect to the rejection of claim 3, but is affirmed with respect to the remaining claims on appeal.

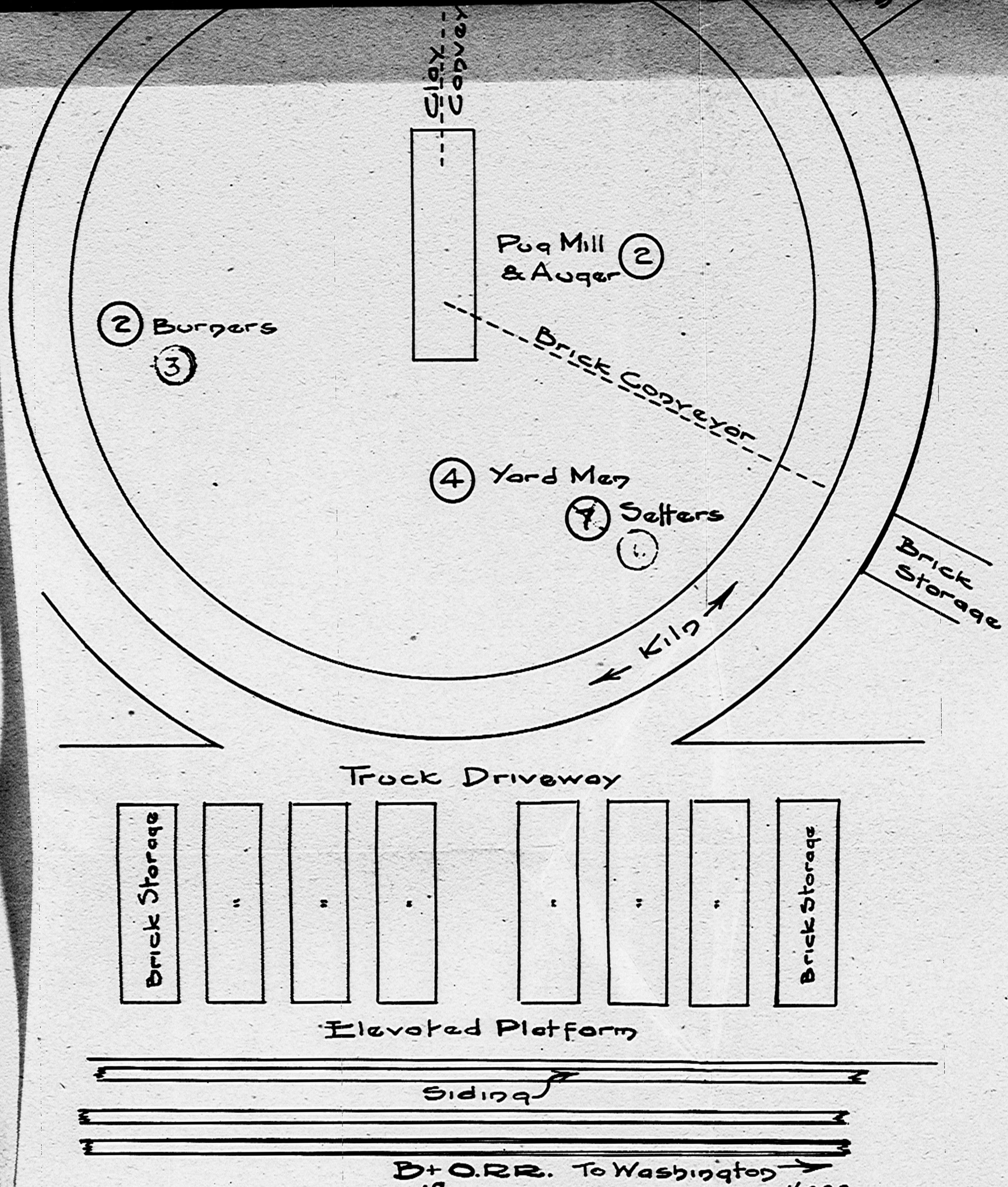
EUGENE LANDERS,)
Examiner-in-Chief,)
)
W. L. REDROW,) *Board*
Examiner-in-Chief,) *of*
) *Appeals*
F. J. PORTER,)
Examiner-in-Chief.)

March 27, 1942

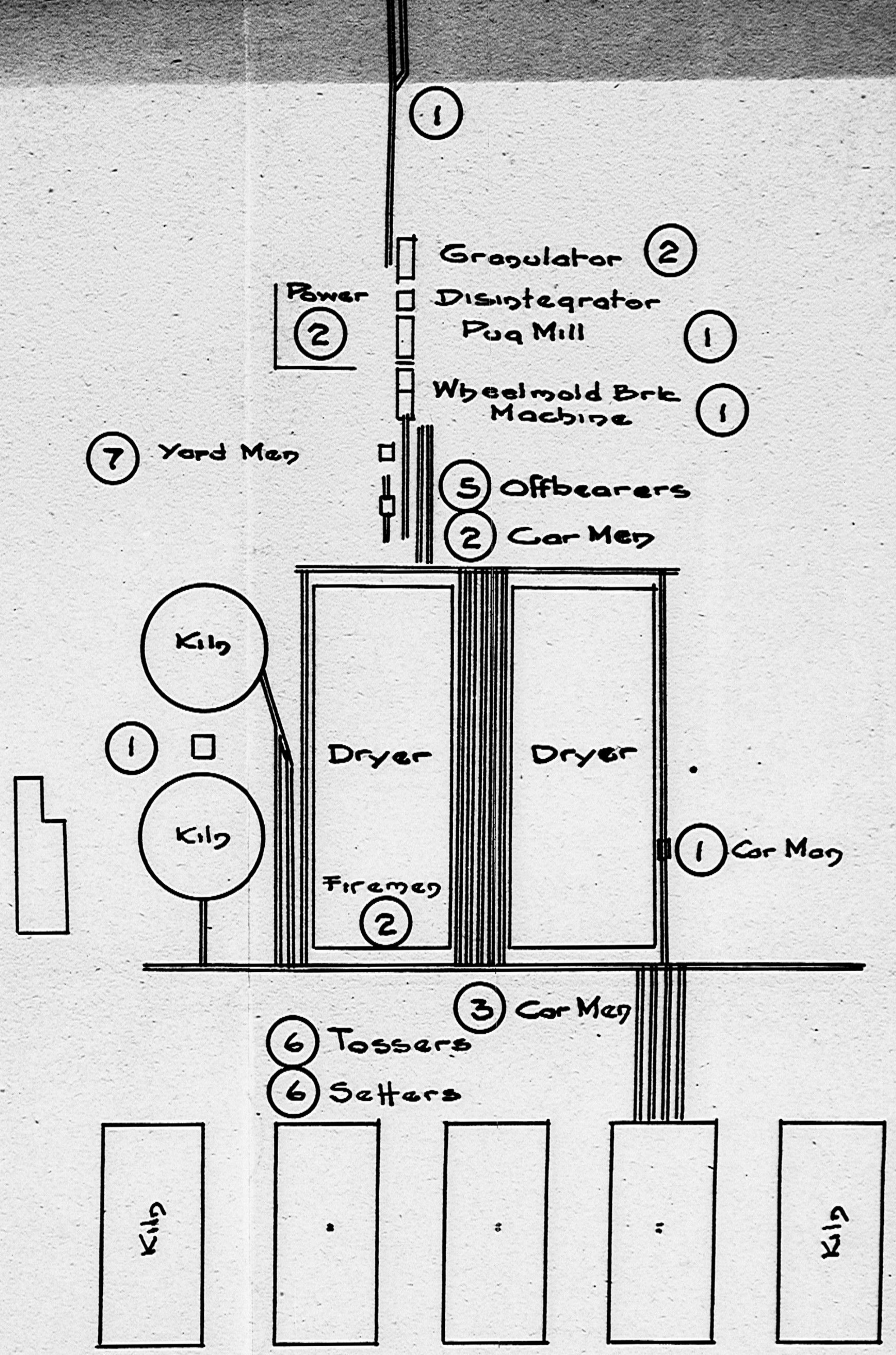
Mr. Bernard F. Garvey,
606 Denrike Bldg.,
1010 Vermont Ave. N. W.,
Washington, D. C.

Plaintiffs Exhibit No 2





18 4.000
Total Men To Operate 20 - 72.000 Brick Cabicity - 3.600 Brk. per Man.



Total Men 45 - 90.000 Brick Capacity - 2.000 Brk per Man.

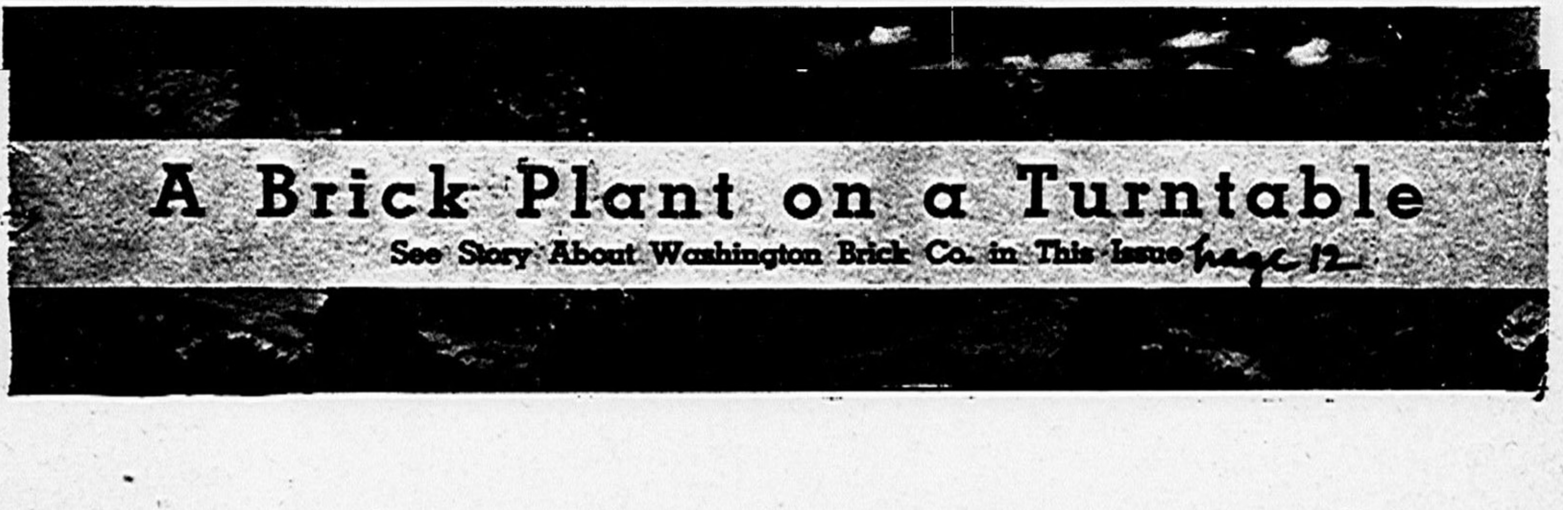
At the extreme right can be seen the inside of the kiln ring. On the left, the clay is discharged from the overhead conveyor into the center pipe which leads into the molding room below. The entire molding room revolves on circular track enabling off bearing conveyor to discharge into any part of the circular kiln.

Fourteen Men Are Making 70,000 Brick Per Day!

"Circle System" Has Machine Room on Turntable—16 Section Continuous Kiln Surrounds Revolving Unit—Accessibility, Compactness and Simplicity Are Features

BRICK making is an old art and a modern science. Practically all improvements in machining, drying, firing, handling, over the old hand made methods have been made during the past 60 or 70 years. That we are, in spite of the latest innovations, still in the state of transition has been recognized during the past years by leading clay manufacturers and engineers. This refers chiefly to the manufacture of structural clayware as brick and tile.

Several years ago, John R. Clark, of the Washington (D. C.) Brick Co., began the development of a new system known as Circle System for making brick and tile. Thomas Somerville III, president of the Washington Brick Co., recognizing the revolutionary merits of the Circle system, prevailed upon the directors of the company to build the plant. About a year ago, T. W. Garve, of Columbus, Ohio, was engaged as engineer for the project comprising the clay testing, surveying, designing, construction, and initial operation of this unique plant. John H. Miller, Jr., of the above company, who assisted throughout the development of the project and who for several years has been superintendent of the old plant at South Washington, is now also superintendent of the new plant. Ellis Lovejoy, who needs no introduction, has assisted unstintingly where his advice was sought. Close cooperation has been characteristic throughout the development of the project, and all suggestions coming



A Brick Plant on a Turntable

See Story About Washington Brick Co. in This Issue page 12

Advancements In Kiln Construction Offer More Efficient Firing

Use of Insulating Refractory Brick Opens New Kiln Era—Improvement of Crowns, Thin Walls, Insulated Bottoms, Heat Recovery and Protection from Weather Considered as Economy Measures

T. W. Garve
Consulting Engineer, Columbus, Ohio

WITH the continuous kiln, not even considering fuel saving or other economies, engineers have placed at the disposal of the clay plant a piece of equipment of far superior design and more scientific principle than most of the existing periodic kilns. There may have been in the past certain types of periodic kilns and patented features. Yet, by far the greater number of periodics were built by the clay workers, and the engineer was called in only for consultation or assistance when difficulties developed. The continuous kiln was and is the handiwork of the engineer.

It stands to reason that the continuous kiln embraces superior features of design, due to the research of the engineering profession. Thus the continuous kiln presents a sounder and technically more correct structure than the customary periodic kiln of former years.

In later years, many periodic kilns were improved or new kilns designed which carried the earmarks of the superior continuous kiln features. For example there is: better drainage, more suitable foundations, more substantial walls and brick bonds, better crowns, more adequate expansion joints, better balanced floors and flues, insulation in several places, the use of control instruments, the application of fan draft, and finally better materials, superior workmanship, and a more accurate construction under the supervision of an engineer.

Let us go back and consider the down-draft kiln and analyze the unit briefly from the top down. The crown is a segment of a sphere for a round kiln, or a segment of a cylinder for a rectangular kiln. In any event, we have a maximum outer surface for radiation and it is a rough surface which greatly increases the radiation. This surface in its relation to radiation is not merely a matter of diameter and rise or the mathematical determination of the area of the spherical surface. Instead, it is the total surface, in all its roughness, exposed to radiation which is the sum of half the surfaces of all imbedded grains. To this we must add the multitude of defects of a crown, that are visible, as high or low places in the sphere, broken brick, cracks, openings, and the like. So we see that this surface is much greater than the mathematical surface, and the radiation must be correspondingly greater. And on many of such kilns, about 9 inches down from such an extensive radiating surface, we have the maximum kiln temperature. In other words, the valuable supply of heat just obtained from the fuel, prior to its application, we are covering up with a loose and cracked lid.

The brick used on most crowns are dense and with a maximum conductivity. Usually there is no protective covering on the crown and often just some loose clay, which is supposed to prevent leakage, but instead takes pleasure in damaging the ware set in the kiln. A covering of clay may be all right, but the clay must be lean or sandy to counteract shrinkage and it in turn must be covered or paved with at least one flat course of brick.

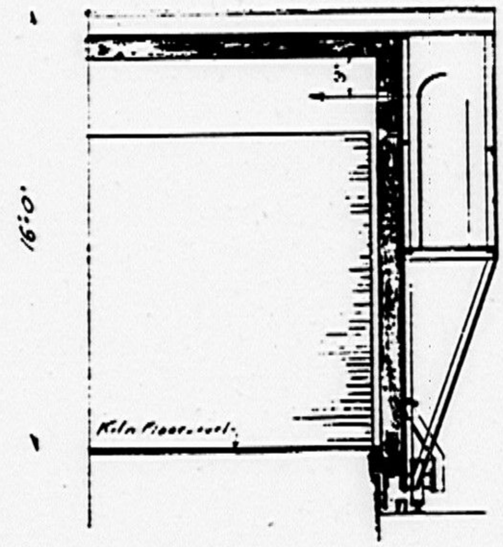


Figure 1: The above drawing shows the method used in the Circle System where the kiln crown is composed of insulating brick hoods. The hoods are moved to different sections of the kiln on a turntable mechanism.

In round kilns, we should use in any event one course of insulating brick above the crown with tight joints and also one course of common brick. Or we can go modern and use insulating refractory brick for the crown, a brick which combines refractory and insulating qualities. It is the same brick we used in our hoods in the Circle System. (Fig. 1.)

In rectangular kilns we can go a step farther by substituting for the curved crown, a flat crown which is a regular ceiling. Flat crowns came into use prior to the introduction of refractory insulating brick and perhaps it is due to this fact that the flat crown has not made more headway.

As long as we were dealing with fire brick of the usual weight, we had to introduce a relatively complicated and heavy structure of steel and perhaps due to this handicap, coupled with some doubts as to safety and additional cost, installations have been comparatively few. The picture becomes an entirely different one with the use of refractory insulating brick. Not only for the construction of arches or crowns but also for entire kiln walls, these brick bring us many new possibilities. The reduction in weight of these insulating fire brick over the regular fire brick has been reduced to one-third (from 6 lb. to 2 lb. per piece). The heat is arrested where it is made, namely, inside of the kiln and not back of a fire brick lining by some insulating material. Therefore, we are in a position to dispose entirely with the customary brick lining as well as with the customary common brick backing. This means a saving of brick and brick construction, a saving of space, and a saving of heat units.

There are various ways of supporting standard flat fire brick arches as

(*Continued on page 43*)

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* Abstract of paper presented before the Short Course at Iowa State College, Ames, in February, 1939. Many of the remarks in this paper are based on the "Circle System" installation at Muirkirk, Md. (October, 1938, BRICK & CLAY RECORD.)

From Plaintiffs Ex. No 4 page 26 Brick and Clay Record of April 1939

Nº 162939 **Classe 8c**

CONFÉDÉRATION SUISSE

BUREAU FÉDÉRAL DE LA PROPRIÉTÉ INTELLECTUELLE

EXPOSÉ D'INVENTION

Publié le 16 septembre 1933

Demande déposée: 11 juin 1932, 12¼ h. — Brevet enregistré: 31 juillet 1933.

BREVET PRINCIPAL

FOURS ÉLECTRIQUES BOREL S. A., Peseux (Neuchâtel, Suisse).

Procédé pour effectuer la cuisson de pièces de céramique.

L'objet de la présente invention est un procédé pour effectuer la cuisson de pièces de céramique.

La cuisson des pièces de céramique se fait actuellement dans des fours fixes. Ceux-ci ne peuvent être pratiquement chargés qu'à froid. Il y aurait peut-être avantage à charger ces fours avec un dispositif mécanique tel qu'un chariot sur lequel les pièces de céramique seraient disposées et qu'on introduirait dans le four. Il y aurait en ce faisant un gain sensible du fait que le chariot pourrait être chargé pendant qu'une cuisson précédente se refroidit dans le four. D'autre part, le chargement serait facilité du fait que l'ouvrier travaillerait beaucoup plus à son aise en empilant les pièces à cuire en dehors du four au lieu de faire ce travail à l'intérieur dudit. L'inconvénient de ce système est que les pièces de céramique non cuites, empilées les unes sur les autres, ne supportent pas les légères trépidations dues au roulement du chariot ou à tout autre dispositif mécanique.

La présente invention prend des propositions précitées les bons côtés et on évite les inconvénients. Selon le procédé, faisant objet de l'invention, on empile les pièces à cuire sur une sole fixe et on la couvre au moyen d'un corps de four mobile.

Le dessin annexé représente, à titre d'exemples, trois dispositifs pour la mise en œuvre du procédé selon l'invention. Ces dispositifs étant représentés schématiquement et partiellement en coupe.

Tous ces dispositifs comprennent un corps de four pour lequel le chauffage électrique a été prévu; mais il serait possible d'y prévoir un système de chauffage à l'huile par exemple.

Le dispositif de la fig. 1 comprend deux soles fixes 1 et 2. Celle de gauche, 1, vient d'être chargée de pièces à cuire 3, empilées les unes sur les autres, tandis que la sole de droite, 2, chargée de pièces 4 dont la cuisson a été terminée, vient d'être découverte par un corps de four 5 en forme de cloche. Ce corps de four est suspendu à un dispositif mobile, par exemple un pont roulant, de sorte qu'il peut être transporté facilement d'une sole à l'autre.

Avec ce dispositif, il n'est plus nécessaire d'attendre que le corps de four soit tout à fait froid avant de le déplacer. Dans chaque cas, on déterminera la température maximum que peuvent supporter les pièces de céramique à l'air et, à cette température, on transportera le corps de four sur l'autre sole qu'on a chargée de pièces à cuire. On économise donc du courant électrique.

Le dispositif de la fig. 2 a aussi deux soles 1 et 2. Le corps de four 5 est mobile sur rails. Il a la forme d'une caisse rectangulaire dont une face latérale est fermée par une porte 6. Après l'ouverture de cette porte, il est possible de retirer le corps de four de la sole 2 et de l'amener sur la sole 1 qui vient d'être chargée de pièces à cuire 3.

Dans le dispositif de la fig. 3, le corps de four est aussi mobile sur rails. Deux parois opposées du corps de four 5 sont formées par des portes 6.

Le seul avantage que ce dispositif possède sur celui de la fig. 2 consiste en ce qu'il laisse plus de liberté pour la disposition des voies de déplacement du corps de four mobile. Par contre, cette forme de corps de four sera plus vite refroidie.

Les détails du câblage électrique, des joints d'étanchéité et des cheminées d'évacuation des gaz provenant de la cuisson des pièces ne figurent pas dans le dessin.

REVENDICATION:

Procédé pour effectuer la cuisson de pièces de céramique, caractérisé en ce qu'on empile les pièces à cuire sur une sole fixe et qu'on couvre cette sole chargée au moyen d'un corps de four mobile.

SOUS-REVENDICATIONS:

1 Procédé suivant la revendication, caractérisé en ce que le corps de four a la forme d'une cloche qui peut être soulevée.

2 Procédé suivant la revendication, caractérisé en ce que le corps de four est mobile sur rails et possède une porte latérale qui permet de l'amener sur la sole chargée de pièces à cuire.

3 Procédé suivant la revendication, caractérisé en ce que le corps de four est mobile sur rails et possède des portes dans deux de ses parois.

FOURS ÉLECTRIQUES BOREL S. A.

Mandataires: BOVARD & Cie., Berne

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FOURS ÉLECTRIQUES BOREL S. A.
Mandataires: BOVARD & Cie., Berne

Fours électriques Borel S. A.

Brevet N° 162939
1 feuille

Fig. 1

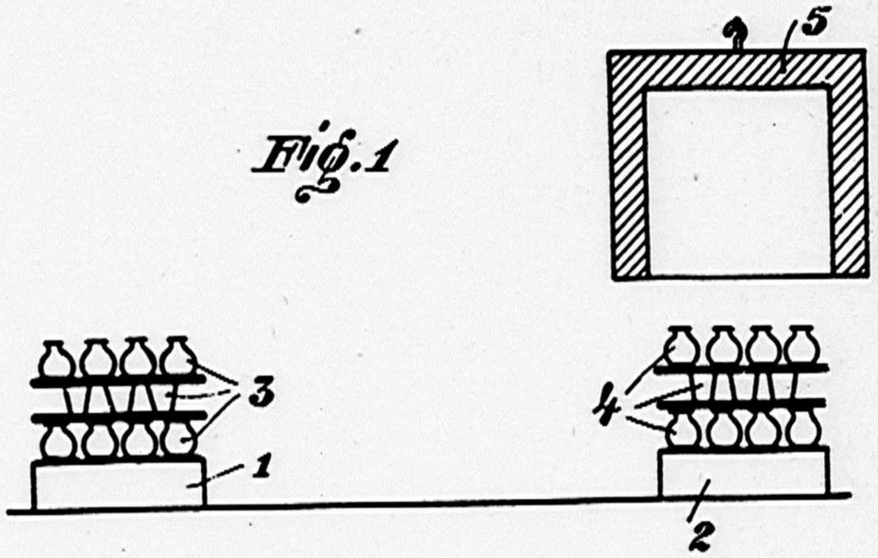


Fig. 2.

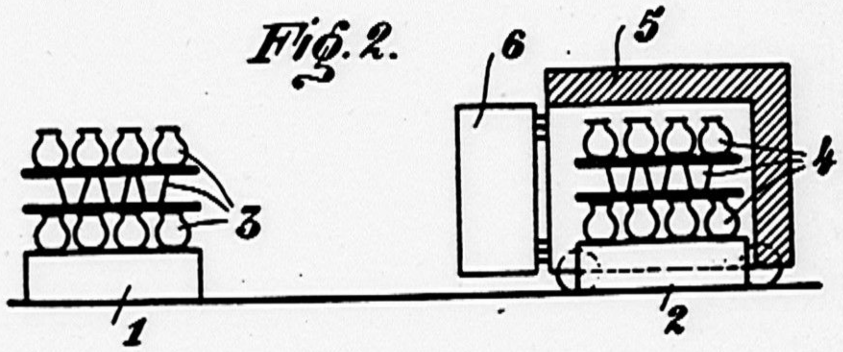
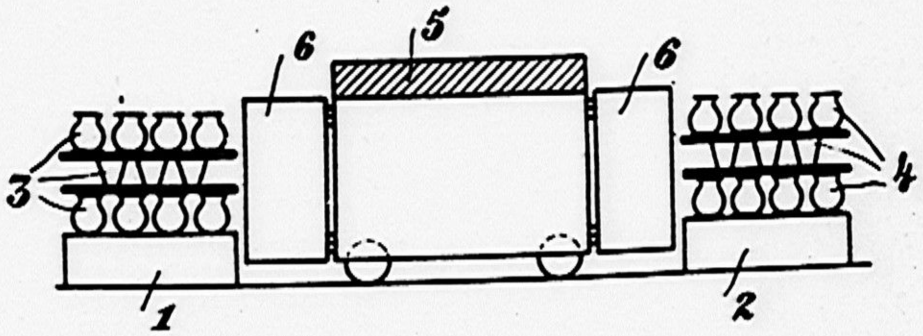


Fig. 3.



Translation of Swiss patent no. 162 939, class 8 c, to the firm Fours Electriques Borel S. A. Peseux (Neuchatel, Switzerland) applied for June 11, 1932, registered July 31, 1933, published Sept. 16, 1933.

Process for effecting the baking of pieces of ceramic ware.

The object of the present invention is a process for effecting the baking of pieces of ceramic ware.

The baking of pieces of ceramic ware is conducted at the present time in stationary kilns. These can not be charged practically except when they are cold. *It might, perhaps,* be advantageous to charge these furnaces with a mechanical contrivance such as a car on which the pieces of ceramic ware would be disposed and introduced into the furnace. If this *were done* there would be an evident gain from the fact that the car *might* be charged while a preceding batch of ceramic ware were cooling in the kiln. On the other hand the charging would be facilitated because of the fact that the workman would be working under easy conditions inasmuch as the pieces to be baked would be stacked outside of the kiln instead of performing this task in the interior thereof. The objection to this system is that the pieces of ceramic ware not baked, stacked one on another, would not withstand the slight jars due to the rolling of the car or any other mechanical device.

The present invention takes from the above mentioned propositions the good parts and avoids the disadvantages. According to this process, the object of the invention, the pieces to be baked are stacked *on a fixed hearth* and covered by means of a mobile kiln structure.

The attached drawing shows, by way of example, three arrangements for applying the process of the invention. These arrangements are shown *diagrammatically* and partly in section.

All these arrangements embrace a kiln body for which electric heating has been provided although it would be possible to have an oil heating system instead.

The arrangement of fig. 1 comprises two stationary hearths 1 and 2. That of the left, 1, has just been charged with pieces to be baked 3, stacked one on another, while the hearth on the right, 2, charged with pieces 4 the baking of which has been completed, has just been uncovered by a kiln body 5 in the form of a bell. This kiln body is suspended from a mobile apparatus, for example a rolling bridge, so that it can be easily conveyed from one hearth to another.

With this arrangement it is no longer necessary to wait until the body of the kiln is entirely cold before moving it. In every case we determine the maximum temperature which the pieces of ceramic ware can withstand in the air and at this temperature we transport the body of the kiln to the other hearth which has been charged with the pieces of ceramic material to be baked.

The arrangement of fig. 2 has also two hearths 1 and 2. The body of the kiln 5 is movable over rails. It has the form of a rectangular box one lateral face of which is closed by a door 6. After the opening of this door it is possible to withdraw the kiln body from the hearth 2 and to convey it to hearth 1 which has just been charged with pieces to be baked 3.

In the arrangement of fig. 3 the kiln body is likewise movable over rails. Two opposite walls of the kiln are formed by doors 6.

The only advantage which this arrangement has over that of fig. 2 consists in that more freedom is permitted in the arrangement of the tracks for shifting about the body of the mobile kiln. On the other hand this form of kiln body will cool more quickly.

The details of the electric wiring, packings and flues for evacuation of gases coming from the baking are not shown in the drawing.

CLAIM

Process for effecting the baking of pieces of ceramic ware, characterized in that we stack the pieces to be baked on a fixed hearth and cover this charged hearth with a mobile kiln body.

SECONDARY CLAIM

1. Process according to the claim, characterized in that the body of the kiln has the shape of a bell and may be lifted away.

2. Process as in the claim, characterized in that the body of the kiln is mobile on rails and has a lateral door which permits bringing it to the hearth charged with the pieces to be baked.

3. Process as in claim, characterized in that the body of the kiln is mobile over rails and has doors in two of its walls.

Tr/CP.

Defendant's Exhibit No. 1.

Prior Art References.

Guthrie	215,606	May	20, 1879
Knacker	511,704	December	26, 1893
Fiske	633,955	September	26, 1899
Kleymeyer	1,913,599	June	13, 1933
Swiss (and translation)	162,939	September	16, 1933

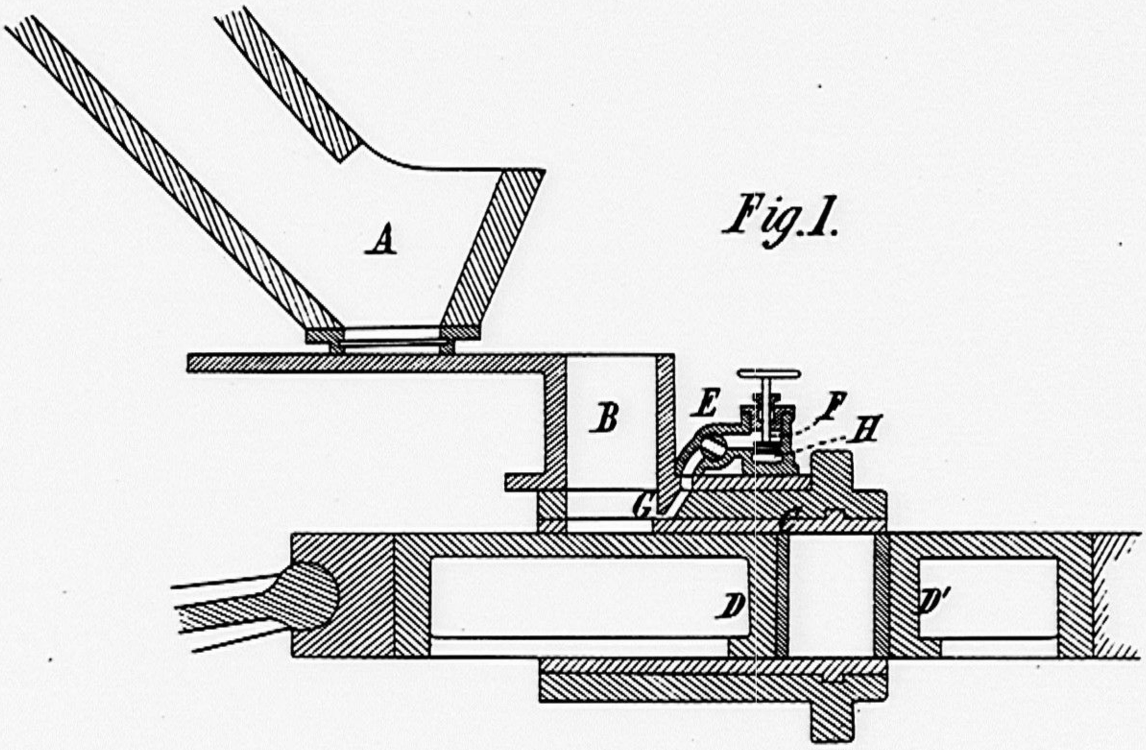
3 Sheets—Sheet 1.

H. GUTHRIE.

Machinery for Manufacturing Bricks, &c.

No. 215,606. **Patented May 20, 1879.**

Fig.1.



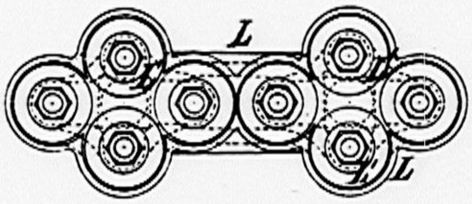
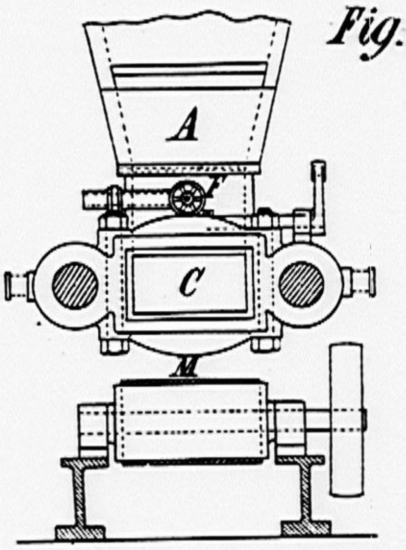


Fig.4.



Witnesses:
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3 Sheets—Sheet 2.

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Machinery for Manufacturing Bricks, &c.

No. 215,606. **Patented May 20, 1879.**

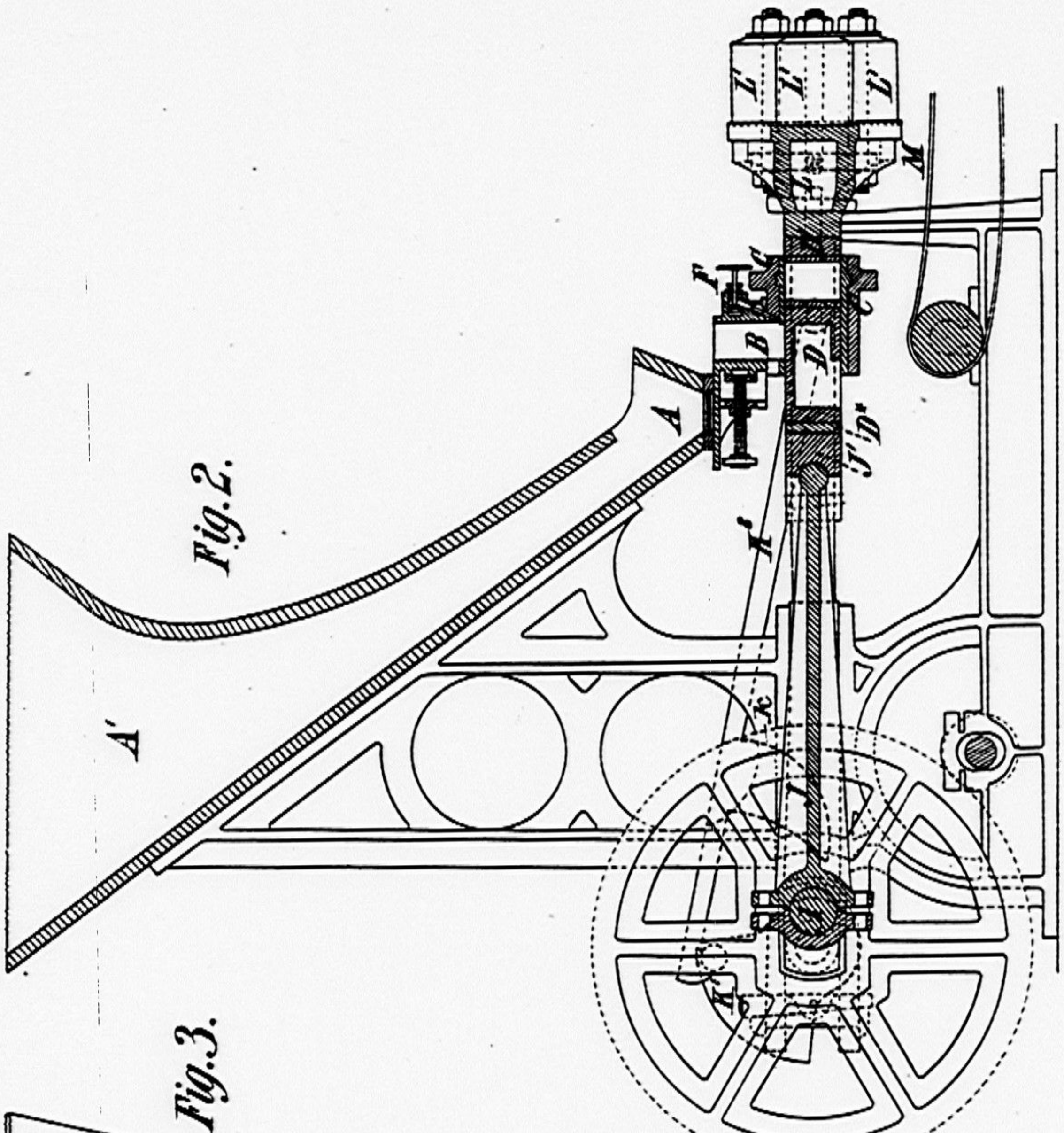

Fig. 2.

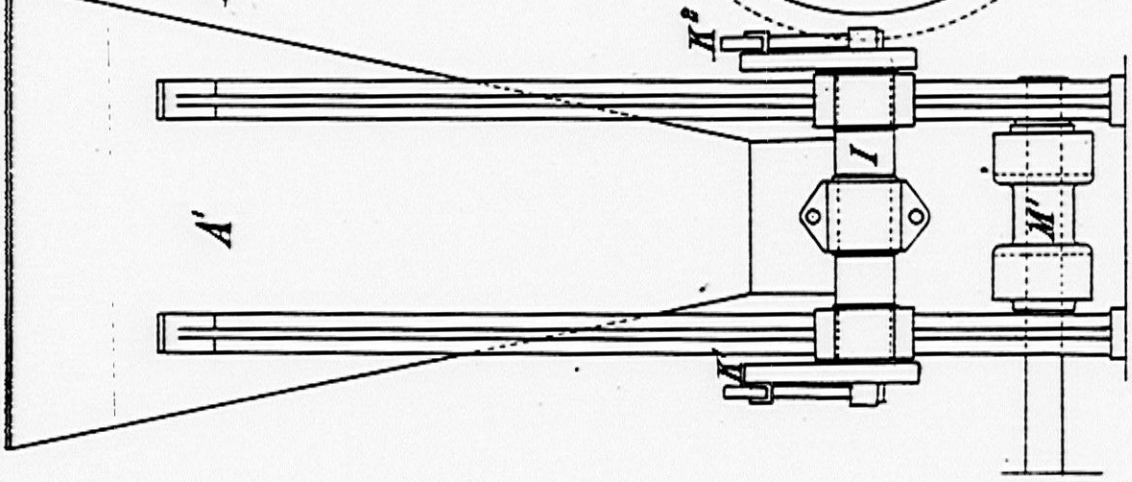

Fig. 3.

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3 Sheets—Sheet 3.

H. GUTHRIE.

Machinery for Manufacturing Bricks, &c.

No. 215,606. **Patented May 20, 1879.**

Fig.7.

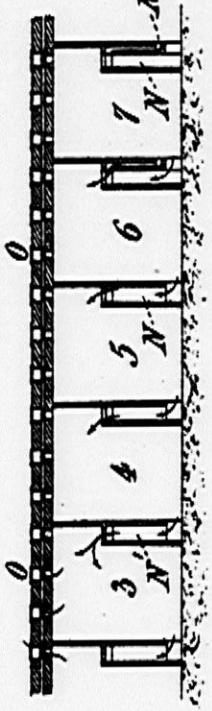


Fig.6.

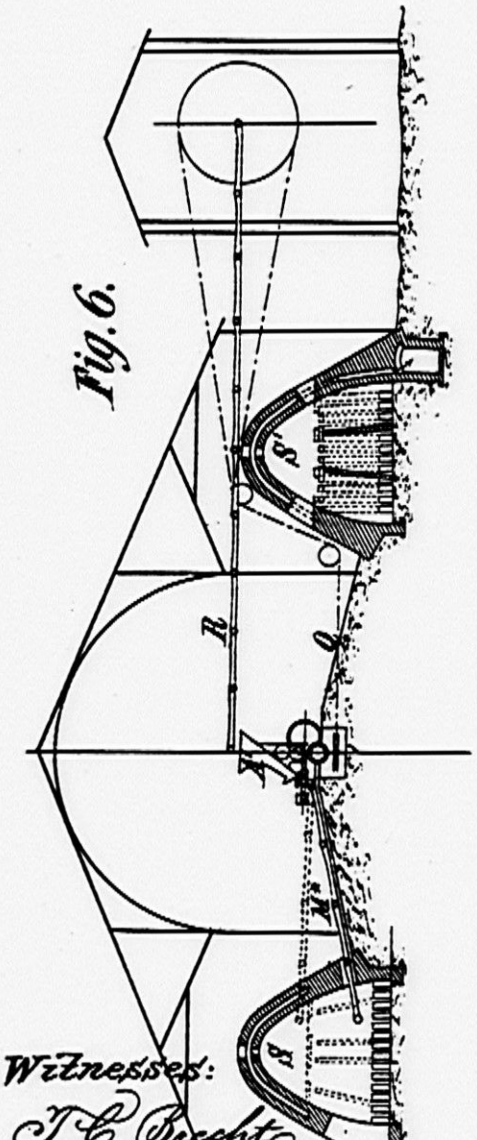
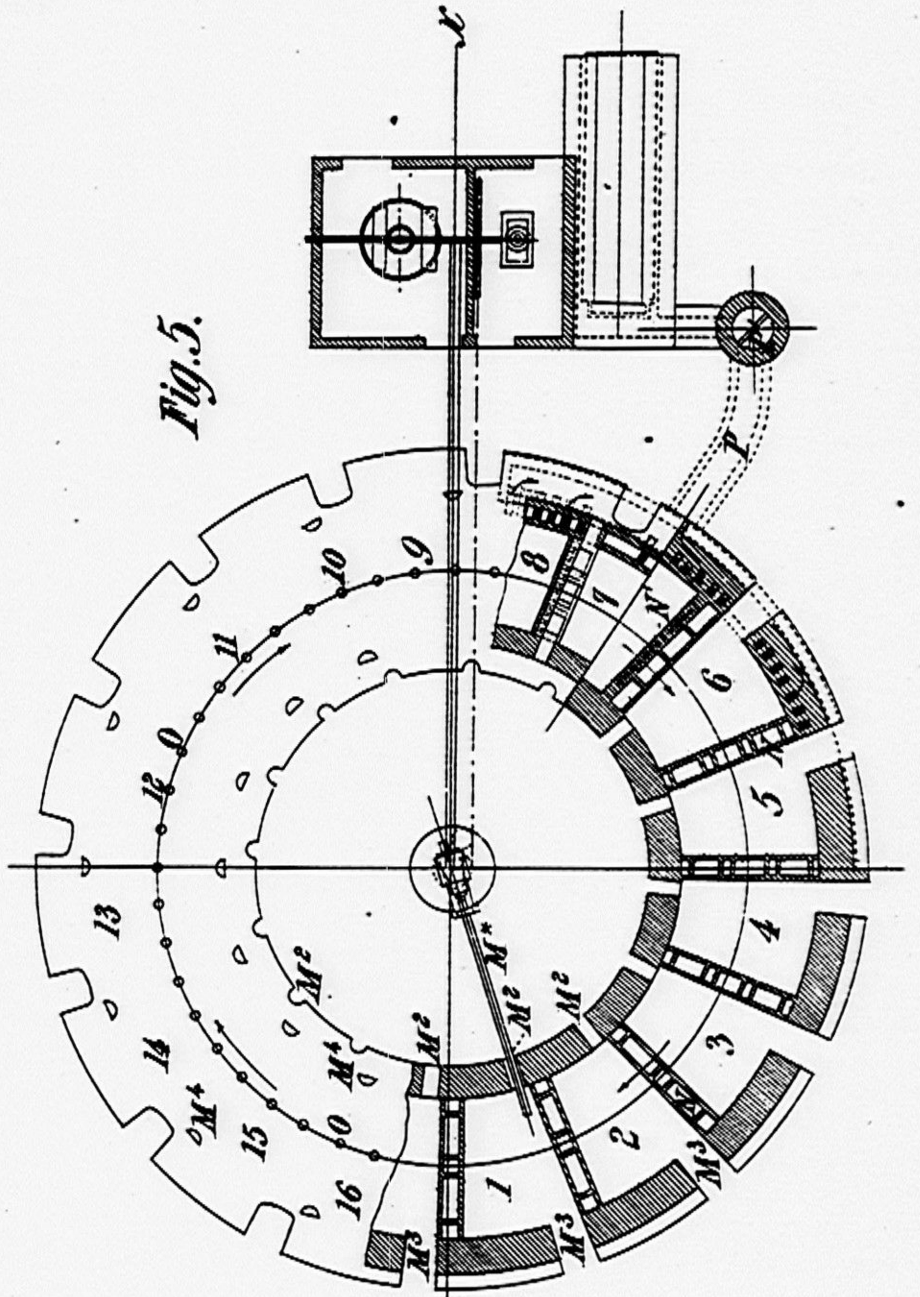


Fig.5.



Witnesses:

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UNITED STATES PATENT OFFICE.

HERBERT GUTHRIE, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN MACHINERY FOR MANUFACTURING BRICKS, &c.

Specification forming part of Letters Patent No. **215,606**, dated May 20, 1879; application filed September 12, 1878; patented in England, September 16, 1876, January 9, 1877, and January 10, 1877.

To all whom it may concern:

Be it known that I, HERBERT GUTHRIE, of Manchester, England, civil engineer, have invented new and useful Improvements in Machinery and Apparatus for the Manufacture of Bricks and similar articles, and for analogous purposes, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in pressing-machines generally used for solidifying granular substances, such as fire-clay, coal-dust, or any other material of like nature, for making bricks, tiles, fuel-blocks, or similar matters; also to kilns and other apparatus for use in connection with such machines.

One part of this invention consists in an arrangement whereby steam is used to displace the air naturally in the interstices of the loose granular substances which this machine is designed to operate upon. A cavity or steam-passage is formed along one or more sides of the measuring-box, as close to the bottom as possible, so that the steam when admitted permeates through the measured charge and drives out the air before it. Then as soon as sufficient time has elapsed for the thorough impregnation of the charge, it is at once dropped into the mold and pressure quickly applied, the supply of steam then being shut off and the charge being inclosed in the mold. The steam so inclosed, along with the charge, condenses and tends to form a vacuum; but, owing to a heavy pressure being at this moment applied, no real vacuum is created, as the particles are closed against each other as fast as the steam condenses, thus forming a compact mass, which has no tendency to split on leaving the mold by the tension of compressed air in its interior.

The steam is admitted intermittently by a valve worked from another part of the machine by an ordinary lever or tappet motion, and so arranged that it will open while the measuring-box is still closed at the bottom, but only so short a time before its opening as may be necessary to allow of the steam getting through the charge with as little as possible escaping beyond. A second valve is provided in the steamway, so as to enable the quantity of steam to be regulated, as well as the duration of injection.

In the improved form of the machine constructed according to my invention I fix one die to a spring-bed, the other, by a connecting-rod, to the main crank of the machine, and the mold, by side rods, to crank-tappets on the same shaft as the main crank, and from which shaft all the movements of the dies and mold are directly obtained.

The moving die is worked directly from the crank by a compression connecting-rod. The mold is worked directly from the crank-tappet by side rods with hooks at their crank ends, formed in such a way that they catch the crank-pins as they come round, and are drawn by them to the end of the stroke. At this point they are stopped in their downward movement by dropping upon a projecting part of the shaft carried through the crank-tappets for that purpose. Being thus stopped they become free of the crank-pins, and are at liberty to traverse back at a quick rate by the tappets coming in contact with projections upon them, causing the mold to be closed by sliding onto the standing die ready for another charge. While standing thus the moving die retires sufficiently to allow of the impregnated charge in the measuring-box to drop down into the mold, and then comes back and squeezes the mass together till it is within a short distance of its maximum durations. The side rods are extended a little beyond the mold end, and so arranged as to come in contact with a stop fixed to the frame of the machine, under which stop they may slip free so soon as sufficiently depressed, and the crank-pin raising the other end, at which point the mold becomes liberated and allows the mold to slide by the friction of the charge in the direction of the standing die, thus making the corners of that face sound and strong. At the point of maximum pressure the side rods drop into gear with the crank-pins and cause the mold to be drawn off while the pressure remains upon the substance molded, part of which pressure is maintained by the spring-bed, causing the fixed die to follow the pressing-die any desired extent, and allowing time for the mold being drawn quite free before the pressure is removed and the molded article allowed to drop upon the traveling band beneath.

The object of this peculiar arrangement is to solidify the corners and smooth the surface by a slight movement backward and forward during heavy pressure; also to maintain a pressure a sufficient length of time after the removal of the mold to allow of any residue of air in the interstices of the material to escape without splitting.

The aforesaid spring-bed to which the fixed die is attached is a further improvement, and serves a double purpose: first, that of receiving the whole of the pressure of the machine, and preventing breakage or undue strain that may come upon it; and, secondly, by giving part of the spring-bed a longer range, so that a portion of the pressure is maintained upon the material pressed till the mold is quite clear of it, and the whole of its sides exposed to the atmosphere, thus preventing splitting, as aforesaid, from internal pressure of air, and giving it ample time to disperse before being relieved.

Should this machine be required to work plastic material, a pugging-cylinder may be substituted for the hopper and measuring-box, the quantity of material being regulated by the die cutting off the supply at the proper time, which may be effected by the adjustment of the mold and its gearing.

A further improvement is in the kiln proposed to be worked in connection with my machine.

The said kiln, as shown in accompanying drawings, is of a circular form, and consists of a number of chambers working into each other in an endless series. The whole of the space encompassed by this series of chambers I devote entirely to the aforesaid machine and gearing immediately connected therewith, clearing out the usual flues and chimney occupying it, the *modus operandi* of which I more fully describe in three divisions, as follows:

First, in the center of this kiln I place a vertical shaft, driven under ground by a cord or strap, and round this shaft I place a turn-table for carrying the aforesaid or any other machine. The vertical shaft, coming up through this turn-table, is connected by suitable gearing to the machine, and communicates the necessary motion to it. On the cord or strap wheel, at the bottom of the vertical shaft, I attach a self-acting clutch, so arranged that should any undue strain come upon the machinery above it will at once be thrown out of gear, and all breakage prevented.

The machine being thus placed can be turned in any required direction at the pleasure of the operator, delivering its goods at any part of the kiln. It is supplied with material by an overhead traveling band leading direct from the grinding apparatus to the hopper, and is relieved of the goods manufactured by another traveling band leading into the kiln through a small opening in the side wall left for that purpose. These goods being dry, or nearly so, are at once set for burning, neither the material nor the finished articles being touched by hand from the time the raw stuff is fed into the grinding apparatus to the delivering of the finished goods inside the kilns, thus saving all the manual and horse labor in carrying the raw materials to and from the different sheds, machines, and kilns, and dispensing with the bogies, tramways, or barrows necessary therefor, as well as reducing the breakage and distorted goods to a minimum.

Secondly, I improve upon the general construction of the chambers of the kiln and the flues connected therewith. The form of arch I prefer is the inverted catenary or arch of equilibrium, that being the one least liable to alter by variation of temperature and requiring the least amount of backing or other support. The abutments are formed in the ground, and are the foundations of the kiln. They are spread out into wide footings, and give the whole structure the necessary stability for resisting any unequal strain likely to come upon the arches. From these abutments or foundations the thickness upward is tapered till a point is reached about half-way to the crown, forming a springing, from which the independent arches rise. At one part of this work small flues are formed, running from the springing to the foundations, and forming a communication between a space above the inner arch and a collecting-flue below; otherwise the work up to this point is solid. This connection, however, may be made direct to the chimney without descending by placing the chimney close to the kiln-arch. Above this two separate arches are formed, one above the other, a space of only a few inches being left between them, serving the purpose of a collecting-flue as well as a cavity, into which the lower arch can expand without coming in contact with the outer arch and causing it to crack, and by means of the air-space preventing much radiation of heat. The first-mentioned use of this cavity is made by forming small apertures at or near the crown of the inner arch, through which the waste gases and steam ascend from the chamber of goods drying below, these apertures being opened or plugged up, at pleasure, with tiles or stoppers, openings also being left in the outer arch, opposite to these, to allow of the stoppers being attended to, and for the purpose of inspection, these outer openings being stopped in a similar manner.

Thirdly, I improve upon the system of firing and working the kiln by forming gas-producers in the divisions of the chambers. These gas-producers are small cavities open at the bottom to the chambers from which the draft is coming, and at the top to the chambers into which the draft is going, and have on one or more sides flues divided only by a thin wall, and open at the top and bottom similarly to the producers. The producers and flues serve alike at the commencement of the operation, being mere passages through which the draft traverses on its way to the chimneys, and, like the goods in the adjoining chambers, collect heat from the waste gases passing through them. The system of collecting and dispersing heat being similar to the well-known Hoffman kiln, the gas-producers and adjoining flues are brought to a red heat before any firing is done in them, so that the fuel on being charged immediately ignites and distills over into the next chamber. These gas-producers are gradually filled up from the top, and are kept hot partly from their own combustion, working like an ordinary gas-producer, and partly by radiation from the adjoining flues, working like a retort.

The flues, as before stated, serve to heat the gas-producers by absorbing the heat from the hot air traversing them. This hot air, on reaching the top, mixes with the gas distilling from the producers, and both, being already very hot, combine and burn with great intensity. Thus all the advantages of the Hoffman kiln are retained, no heat whatever being lost except by radiation through the walls of the chambers, and this reduced to a minimum, while the finest goods may be burned without fear of stain from the fuel being mixed with them, as in the working of the kiln before named.

Fire-grates are not required, nor are any dampers required in hot places where they would be liable to damage or to get out of order, nor is any cold air admitted to the fires or chambers, as in the Ensor kiln.

The only dampers I use, besides the stoppers referred to, are one set placed across the top of the producers and flues of the chamber just being set, and which may be made of a few boards or sheets of iron, luted over with sand to prevent leakage of air.

In the drawings, Figure 1 is an enlarged section of one of the improvements of my machine constructed according to this invention, showing the arrangement for impregnating the charge with steam. Fig. 2 is a longitudinal section through the center of the machine. Fig. 3 is an end view, the spur-wheels not being shown. Fig. 4 is a cross-section taken in front of the mold, and the view above it shows the springs and the girder carrying them. Fig. 5 is a general plan of the works, showing the annular kiln with the machine in the center and the grinding-apparatus engine and boiler outside. Fig. 6 is a vertical section on the line *x x*. Fig. 7 is a circumferential section through the chambers.

In Fig. 1, A is the bottom of the main hopper. B is the measuring-box. (The adjusting-screw is not shown.) C is the mold. D D′ are the dies or presses. E is the valve for regulating the period of injection. F is the valve for regulating the quantity injected. G is the lip for protecting the orifice from being choked, and H is the steam-passage leading from the boiler.

In Figs. 2, 3, 4, I is the actuating-shaft, from which all the motions are obtained, as before described. J is the connecting-rod, giving motion directly to the moving die. K^1 is the crank-tappet, governing the motion of the side rods K^2 to the mold C and measuring-box B. The connecting-rod is held at the sliding end by a slide, J′, upon which the moving die D is secured, a loose plate, D*, being placed between them, so as to allow of the easy removal of that die. L is the girder carrying the springs L′ L′ and the stationary die D′. The mold is made in halves for the easy removal of the lining.

The measuring-box is steam-jacketed, and has one adjustable side, regulated by a screw and hand-wheel.

The steam-injector is regulated by the small valve F, or by a small slide-valve. A′ is the hopper, under which the measuring-box slides to receive its charge. A small slide or damper is placed at the bottom of this hopper for the purpose of stopping the feed at any moment. A is the bottom of the main hopper, or a small supplementary hopper placed immediately over the damper and below the main hopper, having an opening for the purpose of watching the supply and clearing any obstruction. M is the kiln-band, onto which the goods are delivered and carried to the kiln, and which is driven by an ordinary wheel and strap from the pinion-shaft M^1. The double effect of the springs is obtained by forming collars on some of the bolts holding them, these collars being on the opposite side of the girder to the springs, so as to allow of their being tightened upon till they are almost home. Beyond these collars the bolts are prolonged, and run through holes in the standing frame, with nuts on the ends, an amount of length for sliding being left equal to the full range of the other springs minus the range remaining in these after being screwed up, as before stated, so that all the springs are brought up home at the same time, each bearing their share of the ultimate pressure. These other springs are held by ordinary bolts fixed at one end to the standing frame, and running through the girder like the first-mentioned bolts, but not having collars, so that the full pressure of these springs may be used, or any part thereof, by regulating the position of their nuts, the range being regulated by the position of the nuts on the sliding length of the first-mentioned bolts. Other springs may be used than those shown as long as they are arranged in similar manner.

I wish it to be understood that I do not intend to limit myself to the details given so long as the particular character of these inventions be retained. I may multiply the number of molds to any extent in one machine by placing them side by side, or by dividing them into sets, and placing them round the same actuating-shaft, or any other similar variation. Or I may use any form of mold necessary for making bull-nosed, side-wedge molded, or other shaped bricks; square, octagonal, and such like form for tiles, embossed or plain, round or square; for the dry Portland-cement process, and artificial fuel, or, indeed, any other form desired. I also may vary the general form of the kiln, and, instead of making it annular, form it in two parallel lines, joined at the ends, or one single lever, making it semi-continuous, so long as the principle of construction and working is maintained.

In Figs. 5, 6, 7, I have shown the said machine placed opposite chamber No. 1, which is supposed to be filling. The band M^*, upon which the finished articles are transferred from the machine to the kiln, is led right into the chamber, and, if necessary, right across the chamber, to any desired extent, the adjustment being made by a telescopic frame-work. The draft of the kiln is worked in the direction of the arrows, No. 2 chamber being set, say, yesterday, No. 3 the day before, and so on throughout the series.

M^2 are the small doors through which the band is put, and which are stopped up with large tiles or a few bricks as soon as the chamber is filled. The large doors by which the chambers are emptied are marked M^3; the small doors through which the fuel is fed are marked M^4.

The gas-producers are marked N and the flues N^1, different arrangements being shown, any of which may be adopted, according to the goods to be burned. The small apertures for examination are marked O, the stoppers for which are shown in Fig. 7.

The main flue to the chimney is marked P, and traverses part of the circumference of the kiln, collecting the waste gases from the cavity between the arches by numerous small flues in the outer wall, as shown by the arrows, and leading them to the large chimney P′.

The sectional part of Fig. 5 is taken at different levels, chambers 1 to 6 being taken about three feet above the floor-line, chambers 7 and 8 being taken at the height of the feeding-doors and above the gas-producers, showing the surface upon which the dampers or boards are put.

The chamber 1, in Fig. 6, is shown in section at S on a line through the band and discharging doors. Q is the inner platform, raised and slightly conical, with the machine in the center over the pit in which the driving-gear is placed. The delivering-band in the said figure of the drawings is shown running through the small door formed for that purpose. The dotted lines above show another position of this band running through the feeding-door above, and is so placed when the chamber is nearly full to complete the filling at the top with as little handling as possible, the setter coming out at that door when finished and bringing the dampers or boards with him to place immediately on the producers of the next chamber; or a second set may have already been placed there.

The discharging-door and the band-door are both built up before the dampers are withdrawn, the setter having only to draw the dampers and place a large tile across the feeding-door as he comes out. This done, the band is placed in the next chamber, and the operation repeated. The long and short alternately-dotted line shows the cord or strap communicating motion from the engine to the machine, R being the overhead-band, leading the granulated material from the mill to the hopper of the machine. S′, Fig. 6, is a section through the gas-producers, between chambers 7 and 8, and through the feeding-doors, a small moving platform being placed opposite the doors then being fired, and shifted round as the firing is changed from one to another.

In Fig. 7 the division foward of chamber 3 shows a section through a flue between the gas-producers. A direct draft is not permitted to ascend from this flue, but is diverted over the gas-producers on either side by a covering placed a little above the side walls, as will be seen by the dotted lines in Fig. 6 at S, thus forcing an intimate combination of the gas and air. This covering also serves to prevent fuel dropping down the flues and stopping the airways. The other divisions are sections corresponding with the numbers and figures in the other views, and do not require further explanation, the form being slightly different, but the mode of working the same. In the chambers 2 and 3 the apertures in the crown of the arch are shown open, stoppers being removed in any number of chambers as may be found expedient.

What I claim is—

1. The method of preparing granular substances for compression herein described, the same consisting in forcing steam into such substances for the purpose of displacing air therefrom.

2. The combination, with the measuring-box, of the steam-pipe opening thereinto and the valves F and E, substantially as described, and for the purpose set forth.

3. The combination, with the measuring-box provided with the lip G, of the steamway extending obliquely behind said lip, substantially as described.

4. In a brick-machine, the combination of a stationary spring-die, a reciprocating mold, and a reciprocating die, substantially as described, and for the purpose set forth.

5. The combination of the dies D D′, mold C, rods K^2, having hooks on their ends and downward projections *k*, and the crank-tappets, substantially as described, and for the purpose set forth.

6. The combination, with the surrounding kiln, of the molding-machine mounted on a turn-table, and an endless belt or apron adapted

to communicate with the various subdivisions of the said kiln, substantially as described.

7. The combination, in a kiln, of a double arch, constructed as described, with a cavity or space between its walls communicating with the chimney, substantially as and for the purposes specified.

8. In combination with the chambers of the kiln, the gas-producers located between said chambers and adapted to operate substantially as described.

HERBERT GUTHRIE. [L. S.]

Witnesses:
ARTHUR C. HALL,
U. S. Consular Clerk, Manchester, England.
SYLVESTER FLAGLER,
U. S. Consular Clerk, Manchester, England.

(No Model.)

2 Sheets—Sheet 1.

A. KNACKER.

KILN.

No. 511,704.

Patented Dec. 26, 1893.

Fig. 1.

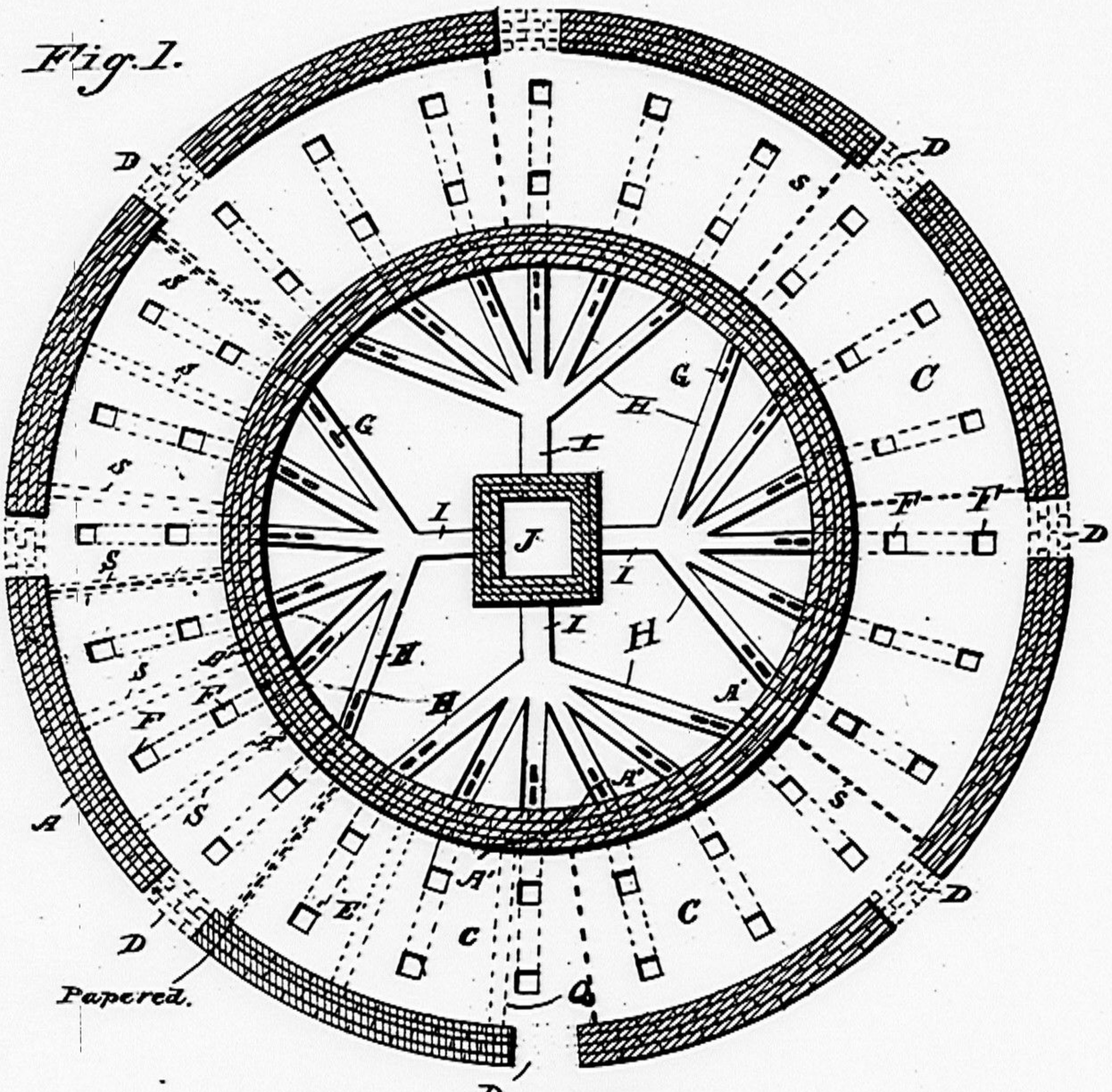
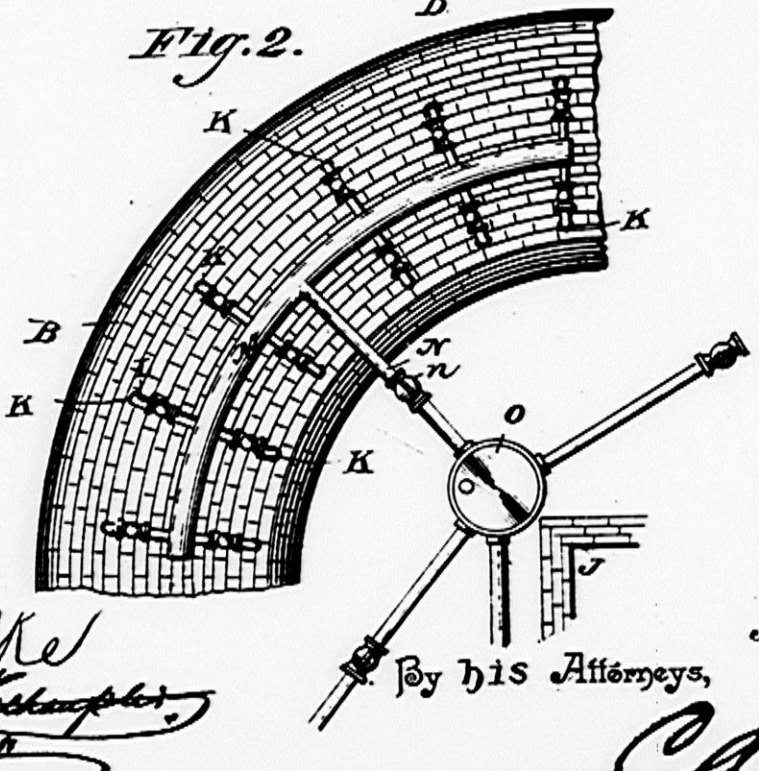


Fig. 2.



Witnesses

J. Ulke

Inventor

Adam Knacker,

By his Attorneys,

C. A. Snow & Co

116

(No Model.)

2 Sheets—Sheet 2.

A. KNACKER.

KILN.

No. 511,704.

Patented Dec. 26, 1893.

Fig. 3.

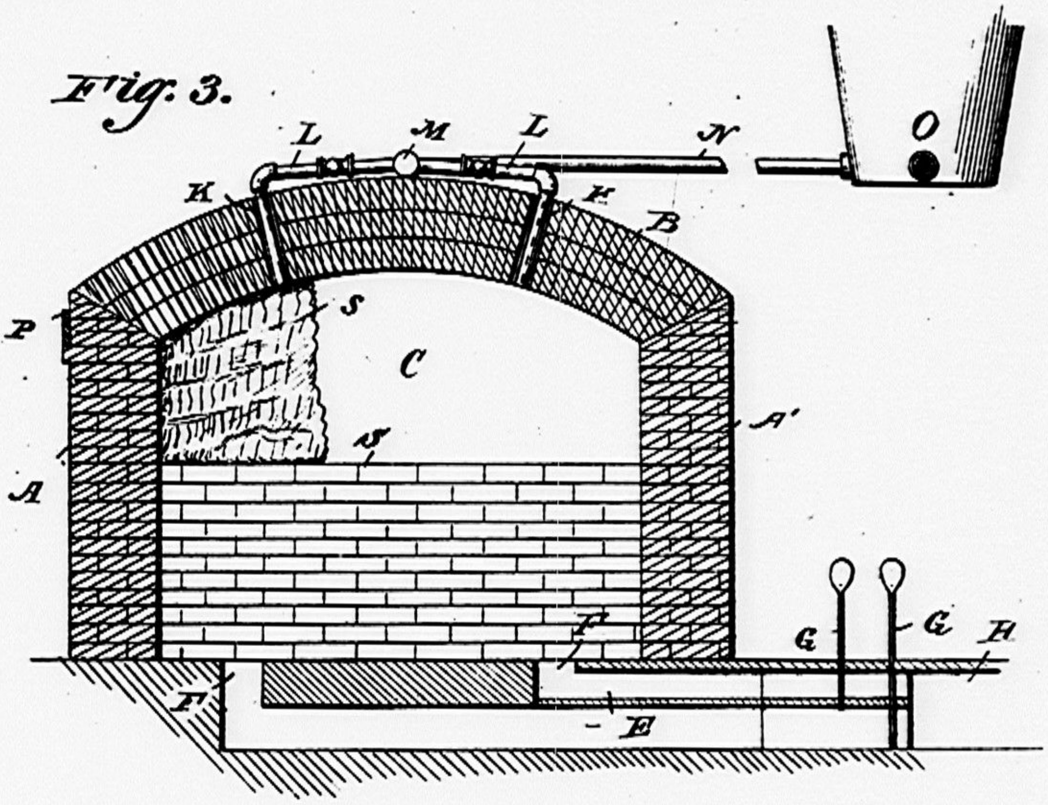


Fig. 4.

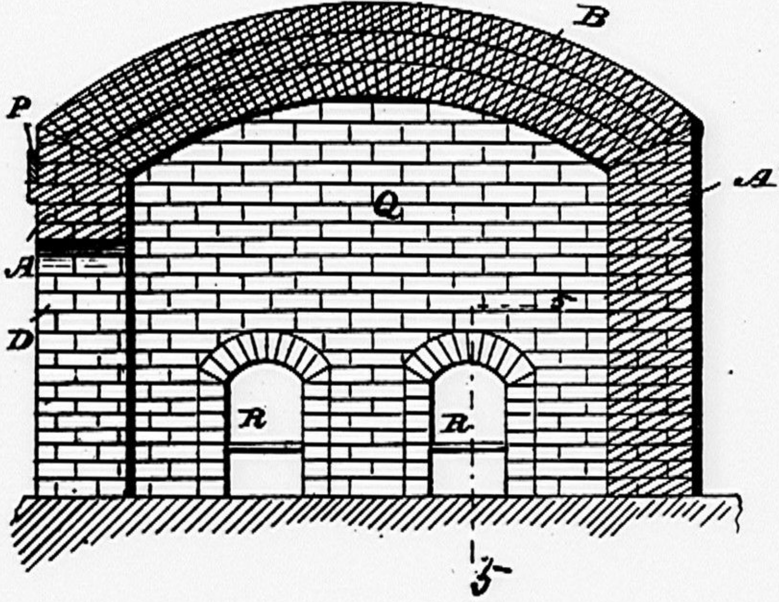
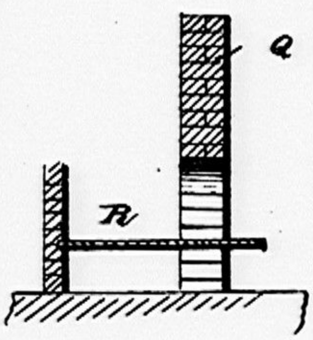


Fig. 5.



Witnesses

J. Ulke

Inventor

Adam Knacker,

By his Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ADAM KNACKER, OF EDGAR, NEBRASKA.

KILN.

SPECIFICATION forming part of Letters Patent No. 511,704, dated December 26, 1893.

Application filed March 24, 1893. Serial No. 467,452. (No model.)

To all whom it may concern:

Be it known that I, ADAM KNACKER, a citizen of the United States, residing at Edgar, in the county of Clay and State of Nebraska, have invented a new and useful Kiln, of which the following is a specification.

This invention relates to kilns; and it has for its object to provide certain improvements in kilns which are adapted for the burning of brick, tile, and other pottery articles.

To this end the main and primary object of the invention is to provide an improved kiln, which shall be so constructed as to provide ready and efficient means whereby the material can be so placed as to allow some of it to burn, a portion to dry, a portion to cool and a portion ready to take out, all at the same time, without any impediment to the operation. Also by reason of the specific construction of the kiln, it is possible to burn brick, tile, crockery, and pottery articles, simultaneously, but at different points in the kiln, thus providing a kiln of great utility and efficiency.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a horizontal sectional view of the kiln constructed in accordance with this invention, showing in dotted lines the position of the baffle walls and the temporary fire wall. Fig. 2 is a detail plan view of a portion of the kiln showing the arrangement of the oil or gas supply pipe. Fig. 3 is an enlarged vertical sectional view of the arched oven or chamber and one of the bed flues therein, showing one of the baffle walls as built therein when placing the material within the kiln. Fig. 4 is a view similar to Fig. 3 taken in front of the temporary fire wall employed in starting the kiln. Fig. 5 is a detail sectional view on the line 5—5 of Fig. 4.

Referring to the accompanying drawings:—A A′, represent outer and inner circular concentric kiln walls, constructed in a suitable height according to the capacity required of the kiln and capped by the inclosing top arch B, which incloses between the concentric walls an endless or circular oven or heat chamber C, in which the material to be burned is placed. The outer kiln wall A, is provided at regular intervals with arched doors D, which provide means whereby the brick or other material can be placed within and taken out of the oven or heat chamber C, said doors being closed by temporary walls filling the same during the operation of burning at any particular portion of the kiln.

The requisite draft for the kiln is secured by the bed flues E, which are formed in the bed of the kiln at regular intervals throughout the circular oven or heat chamber, and such flues are provided with separate and independent draft openings F, which open into the oven or chamber C, adjacent to the outer and inner inclosing walls, so that the proper draft can be secured for the brick or other material being burned, and said separate and independent draft openings F, which open into each single flue E, are controlled by separate dampers G. The dampers G, provide means for separately controlling the draft openings F, communicating with each bed flue E, so that the heat within the oven or heat chamber can be properly regulated at any point therein. The said bed flues E, are provided with flue extensions H, which are arranged in groups in the space inside of the inner kiln wall A′, and converge to common escape pipes or flues I, which open into the centrally arranged stack J, which is of a sufficient height to create the necessary draft inside of the kiln body, or at least the endless oven thereof.

Piercing the top arch B, of the kiln oven C, are a series of fuel openings K, which are arranged in pairs so as to open into the oven C at a point between the regularly spaced bed flues therein, and to provide for supplying the necessary heat to the material within the kiln body. The fuel openings K provide for the supply of any suitable fuel, but are illustrated as accommodating the valved oil or gas pipes L, which are connected to the common distributing pipe M, arranged over the top of the circular kiln and having connected thereto the main supply pipes N, provided with valves *n*, and connected to a suitably arranged oil or gas tank O, which supplies the several pipes with the necessary liquid or gas fuel which is ignited inside of the circular or endless oven or chamber C, at the fuel openings K, in the manner to be presently described. The valves in the pipes L, provide means whereby the heat can be formed at any portion of the kiln, and in practice, the several pairs of the pipes L, are brought into play successively one after another as the burning advances in the oven or heat chamber.

In order to strengthen the kiln structure, I employ a circular strengthening band P, which encircles the upper outer edge of the outer kiln wall A.

The interior construction of the kiln oven or heat chamber during the operation of burning, will be more apparent by being described in connection with the operation of the kiln, to wit:—In starting the burning in the kiln, the operator first builds a temporary fire wall Q, transversely across the oven or heat chamber C, from the top to the bottom thereof at one side of one of the filling doors D, and said temporary fire wall is provided near its lower end with two or more fire pockets R, communicating with the space back of said fire wall, so that the heated air and other products of combustion from the fire placed in the fire pockets R, will pass into the oven or chamber C. Before starting the fires in the fire pockets R, the brick or other material is placed in the heat oven or chamber C, beyond the temporary fire wall from the other filling doors or openings. In placing the brick or other material within the endless oven or chamber C, temporary imperforate baffle walls S, are built up from the bottom of the kiln between the bed flues E, therein, said baffle walls being also built out of the unburned material, and serve to prevent cold drafts from drawing into the burning brick, and also provide means for causing the heat to rise into the space over one of the bed flues, when the dampers shut off the draft in an adjacent bed flue when the brick or other material over such adjacent bed flue is sufficiently burned. The oven or heat chamber is filled in the manner described from a number of the filling doors or openings before the fires are started in the pockets R, and after filling in the material in the spaces between such filling openings, the same are closed up by temporary walls as herein referred to, and then the operator starts the fires in the temporary fire wall where the burning is to start. Simultaneously with starting the fires in the pockets R, to start the kiln, the liquid or gaseous fuel directly adjacent to the temporary fire wall may also be ignited, in order to rapidly and quickly burn the brick at points adjacent to the fires. As the material becomes sufficiently burned at the point of starting, the draft through the bed-flues at such point is cut off by means of the dampers G, and the next succeeding bed flues opened so that all the heat will pass into the brick or other material beyond the closed flues. The heat at the fuel openings is also shut off and started to correspond with the closing and opening of the bed flues, so that the burning in the kiln will be done successively, that is from the point of starting at the temporary fire wall around through the entire oven or heat chamber. The space at one side of the filling doors D, and above the baffle walls S, which extend up about half the height of the heat oven or chamber C, is filled with paper or other combustible material, *s*, which serves to prevent cold air from being drawn from the end of the kiln opposite the fire end, into the burning material, but which, as the heat or fire advances, will be burned down so as to allow the heat to come from the burning and burned brick over into the unburned brick, so that at the same time portions of the brick are burning, other portions beyond the same are drying preparatory to being burned, thus combining in the kiln efficient means for drying out the brick before the same are burned, and simultaneously with the burning of other portions of the kiln. The disposition of the baffle walls S, above which is filled in with the combustible filling *s*, is clearly indicated in Fig. 1 of the drawings by the heavy dotted lines, and it will of course be obvious that it is necessary to have such baffle walls thus arranged so as to prevent the cold air from being drawn into the kiln from the end, opposite the fire end, where one or more of the filling doors may be uncovered. By reference to Fig. 3 of the drawings, this filling is partly indicated and it will also be observed that it is intended to have the same combustible material face the baffle walls over which it is placed, so that perfectly air tight walls or partitions will be formed for the purposes specified. As the heat is advanced around the endless oven or heat chamber, the temporary fire wall is taken out so that the burned brick can be removed, while at the same time the operator is constantly filling in ahead of the fire, so that the burning of the brick or other material can be kept up an indefinite time, the fires from the fuel openings being so arranged and regulated that brick can be simultaneously filled into the kiln and taken out, the kiln combining the drying and burning together. It is of course understood that the temporary fire wall with its fire pockets is only employed for starting the kiln at the beginning of a burning season, and, as already stated, is taken out, after the burning has advanced sufficiently far into the oven for the entire burning season

From the foregoing it is thought that the construction, operation and many advantages of the herein-described kiln will be apparent without further description, and I will have it understood that changes in the form, proportion and the minor details of construction as embraced within the scope of the appended claims may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In a kiln, a circular or endless heat oven having filling openings in its outer wall, regularly spaced bed flues arranged in the bed of the oven and having separate draft openings communicating with the interior thereof, a common smoke stack for the several flues, short temporary imperforate baffle walls arranged transversely within the oven between the bed flues, and heating devices arranged at the top of the oven, substantially as set forth.

2. In a kiln, the combination of an inclosed circular heat oven or chamber having filling openings in its outer wall, regularly spaced bed flues formed in the bottom of the oven or chamber and communicating with a stack, a temporary fire wall adapted to be arranged transversely across the oven or chamber at one side of one of the filling openings and provided with fire pockets, baffle walls adapted to be built with unburned material between the bed flues and extending half the height of the oven or chamber, and heating devices arranged at the top of said oven or chamber, substantially as set forth.

3. In a kiln, a side and top inclosed circular or endless heat oven or chamber provided with filling openings in its outer wall, and fuel openings in the top arch thereof, regularly spaced bed flues formed in the bottom of the oven or chamber and leading to a common stack, a series of vertical baffle walls adapted to be built with unburned brick from the bottom of the oven or chamber between the bed flues to half the height of such oven or chamber, a filling of combustible material adapted to be placed on top of certain of said baffle walls, and heating devices at the top of the oven or chamber, substantially as set forth.

4. In a kiln, an endless or circular heat oven or chamber having a top arch provided with fuel openings, a common distributing pipe M, arranged longitudinally over the top of the arch and provided with valved branches leading into said fuel openings, a liquid or gaseous fuel tank, and valved supply pipes leading from said tank to the common distributing pipe, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ADAM KNACKER.

Witnesses:
H. W. Stout,
C. A. Voorhees.

No. 633,955. Patented Sept. 26, 1899.

J. P. B. FISKE.

APPARATUS FOR HANDLING BRICKS IN MANUFACTURING SAME.

(Application filed Sept. 6, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

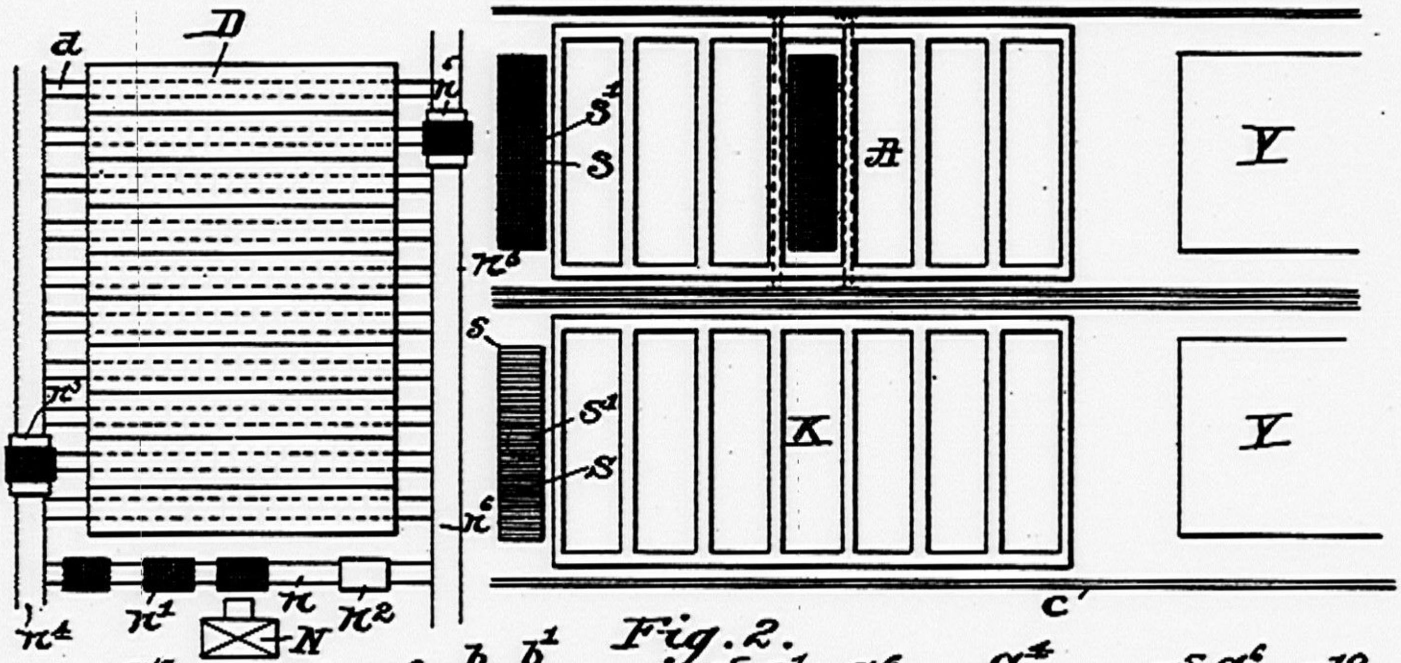
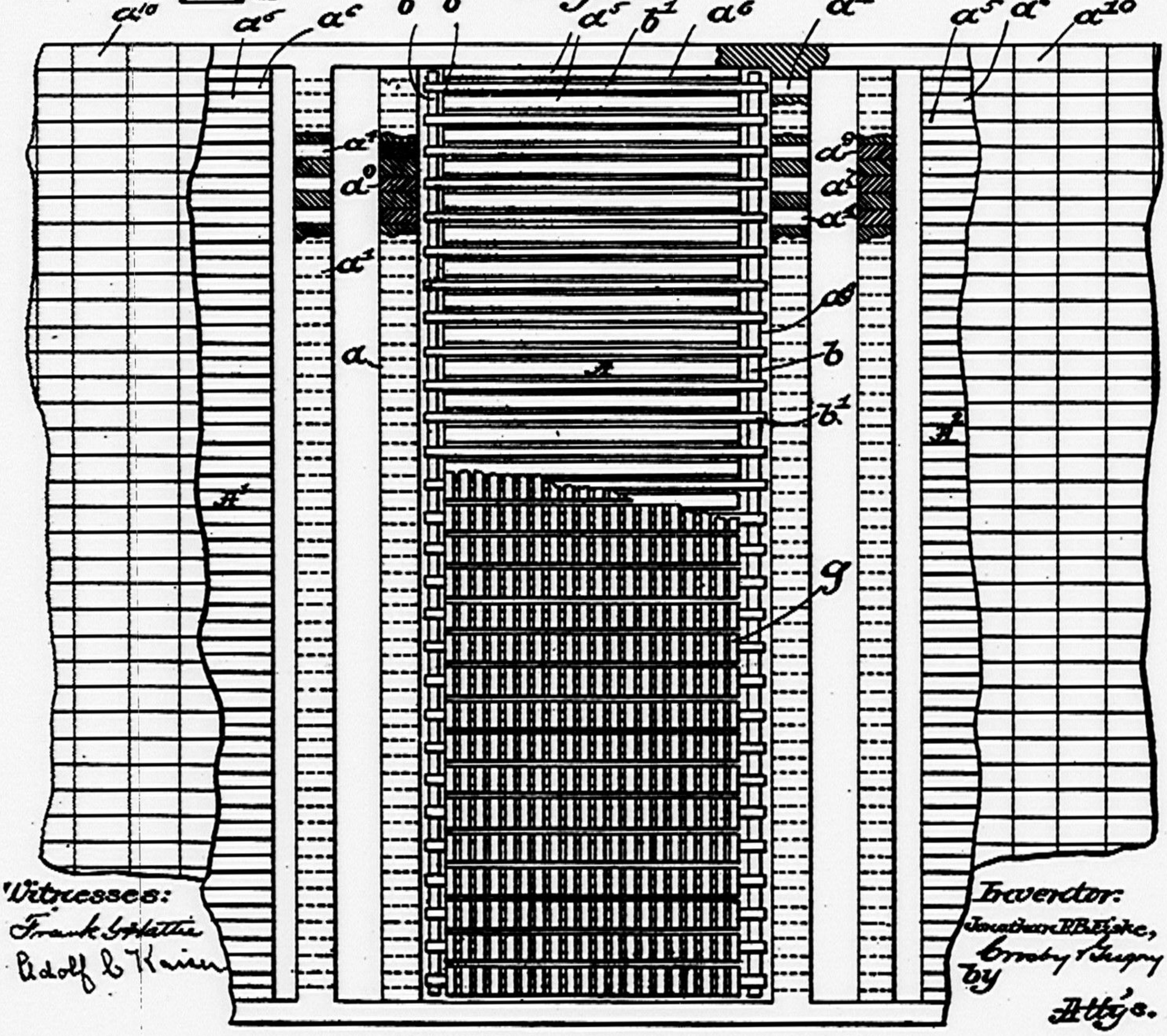


Fig. 2.



Witnesses:
Frank G. Hattie
Adolf C. Kaiser

Inventor:
Jonathan P. B. Fiske,
by Crosby & Gregory
Att'ys.

No. 633,955. **Patented Sept. 26, 1899.**

J. P. B. FISKE.

APPARATUS FOR HANDLING BRICKS IN MANUFACTURING SAME.

(Application filed Sept. 6, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

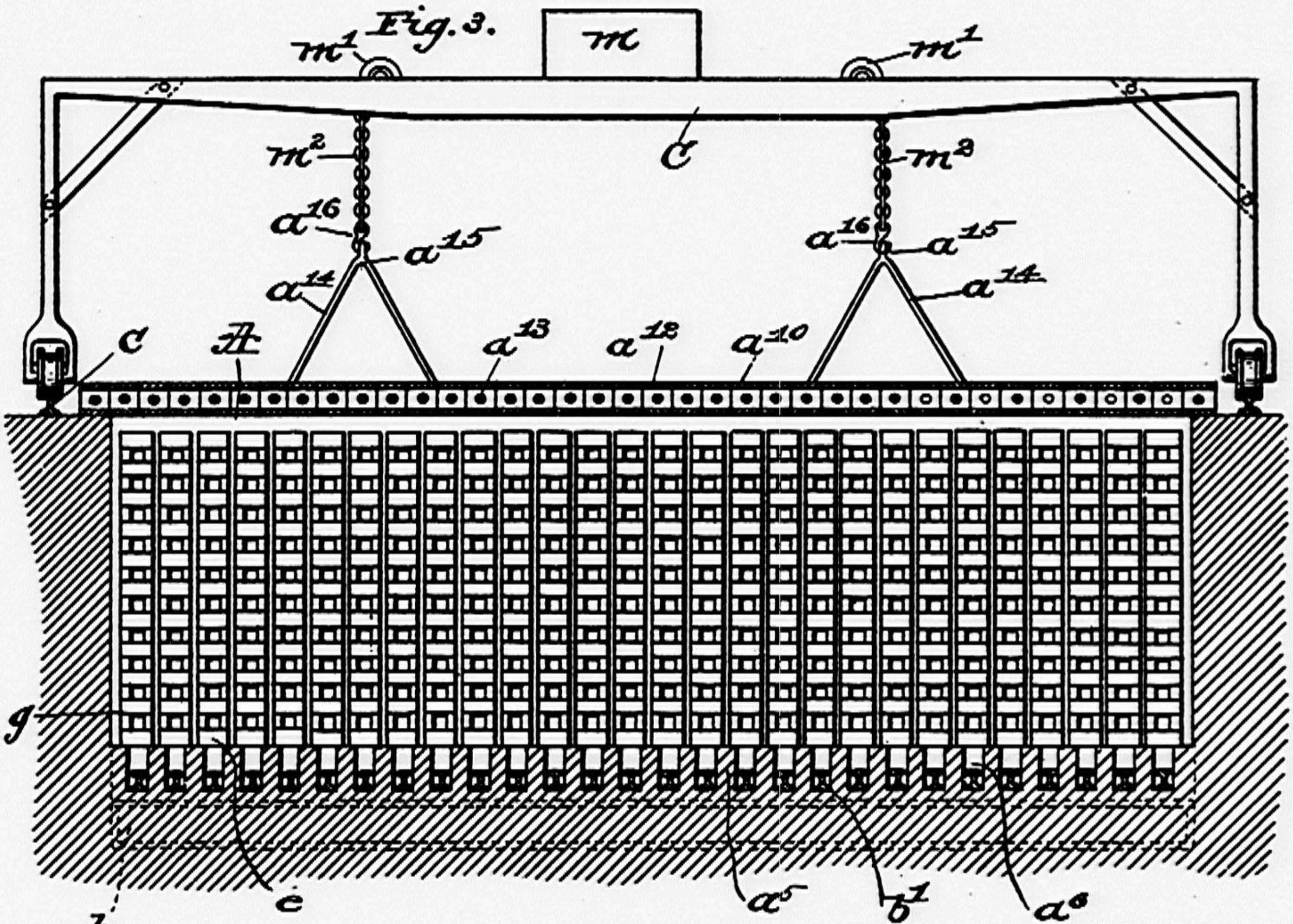
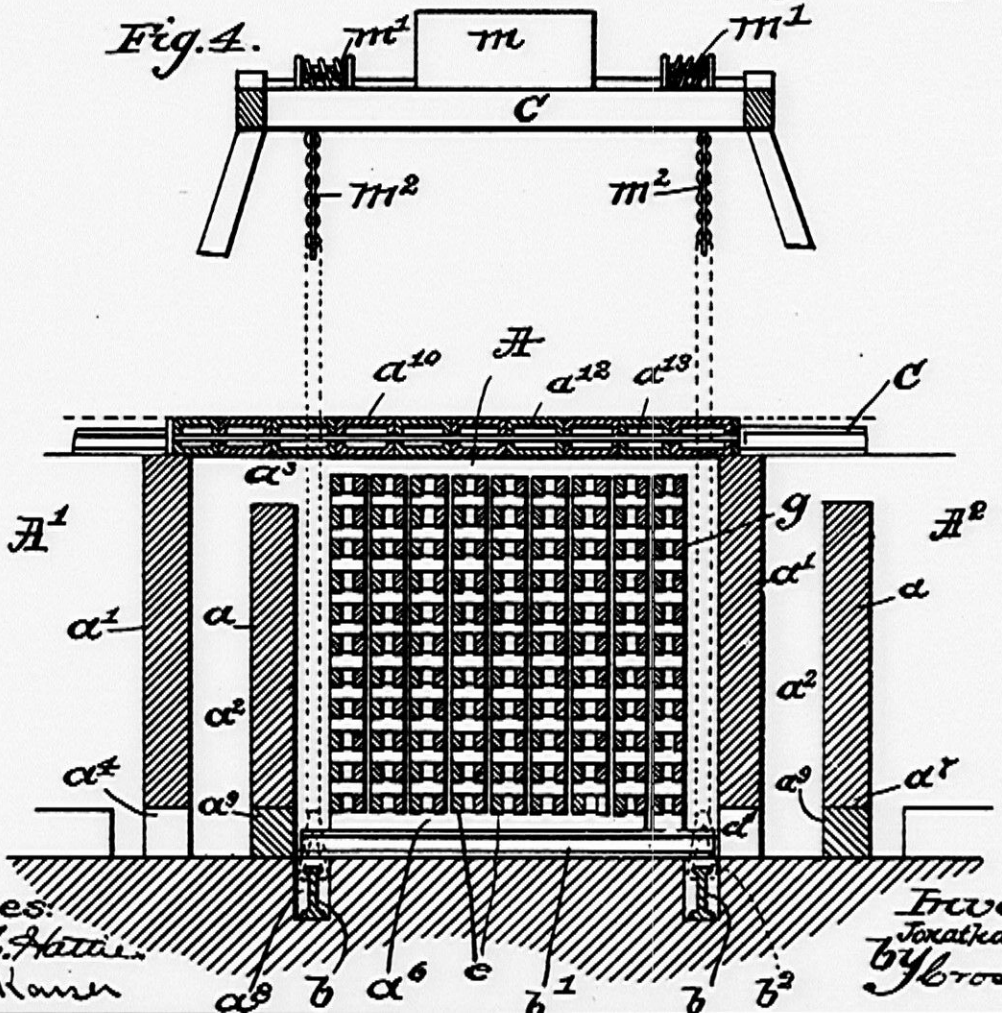


Fig. 4.



Witnesses:
Frank G. Hattie.
Adolf C. Kaiser

Inventor:
Jonathan P.B. Fiske,
by Crosby & Gregory

UNITED STATES PATENT OFFICE

JONATHAN P. B. FISKE, OF NEWTON, MASSACHUSETTS.

APPARATUS FOR HANDLING BRICKS IN MANUFACTURING SAME.

SPECIFICATION forming part of Letters Patent No. 633,955, dated September 26, 1899.

Application filed September 8, 1899. Serial No. 729,610. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN P. B. FISKE, of Newton, county of Middlesex, State of Massachusetts, have invented an Improvement in Apparatus for Handling Bricks in the Manufacture of the Same, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In order that my invention may be properly understood, I deem it best to explain that the manufacture of bricks as heretofore practiced has been comparatively slow and expensive, due largely to the fact that the handling of the bricks has required so much hand labor.

The details of manufacture of bricks vary greatly according to their kind, whether common bricks, face, enamel, or fire bricks, and according to the process of manufacture, whether by the "dry-press," "stiff-mud," or "soft-mud;" but in the case of all kinds and of all processes the same expensive system of handling each brick separately over and over by hand is employed. Thus, for instance, in the manufacture of common bricks by the most improved methods the bricks are usually molded in a suitable brick-machine and piled one by one by hand on cars, which when loaded are pushed by hand over tracks into a "drier." When the bricks are sufficiently dried, the loaded cars are then pushed each by two or three men over long tracks into the kilns, where the bricks are taken off and passed by hand to the "setter," who stacks them one by one in the proper position for burning. They are taken from the stack after being burned, passed by hand to wheelbarrows or hand-trucks, taken thereon a few at a time over long distances to the stock-sheds, where they are removed and passed again by hand to the man on the stock-pile.

The immediate removal of the burned bricks from the kiln is often omitted where the old-fashioned updraft kiln (whose walls are constructed of green bricks) is used, as the cost of building up such a kiln is so little that it is deemed more economical to build new kilns than to empty burned ones. In this case the bricks stand until they can be put directly into the delivery-wagons and carted to the buyer. The excessive cost of fuel for burning such a crude kiln, the large quantity of poor bricks obtained, and the labor of building it anew for each burning render it desirable to use a permanent kiln of modern construction; but in such event it is necessary to remove by hand at once the burned bricks at a large expense in order that the kiln may again be filled with green bricks and burned. So great, however, is the cost of hand labor in America that common-brick manufacturers have been very slow to adopt the permanent kiln, particularly what is known as the "continuous" kiln, which for years has been almost universally used in Europe, where hand labor is cheap.

The continuous kiln, as is well known, requires only about one-third the fuel of the old-fashioned kiln described above, but has been largely prohibited in this country by the extra labor of handling the burned bricks required. Furthermore, the various systems of handling bricks during the manufacture of the same at the present time involves so many distinct handlings and positions of the individual bricks, whether green or dried, that various internal lines or planes of structural weakness are developed that subsequently appear in the completed bricks, rendering the latter inferior in quality. For instance, the frequent shifting of the individual bricks from one place to another—for example, first onto the cars, then into the drier, and finally into the kiln—makes it practically impossible to preserve the respective bricks always in the same relation one to another and to retain their original formation and support, and each new pressure or strain to which they are subjected tends to weaken the same structurally. If, for example, in the piling of the bricks in the first instance various bricks are called upon to sustain loads at their ends while themselves supported at their middle points and subsequently these same bricks in further handling or piling are called upon to sustain loads at their middle points while themselves supported at their ends or if, as is frequently the case, by careless handling pieces of the green bricks are chipped off and remain upon the supports for the bricks, causing some of the lowest bricks to be held in inclined or tilting position, the entire stack will be thrown out of proper alinement and support, so that nearly all of the individual bricks are subjected to unnatural and weakening pressures and stresses. Usually this frequent bending or pressing of the bricks one upon another first in one direction and then in another or first at one point and then at another while the bricks are yet in a more or less soft or green state, and particularly in connection with the jarring incident to the wheeling of the same in small loosely-packed lots, I have found tends to weaken the same internally, usually by developing internal planes of weakness that during the burning are developed into open and exposed cracks as a rule, although frequently the burning opens the cracks beneath the surface, leaving them concealed at the surface by the harder outer skin of the bricks. In the first instance the exposed cracks developed from these planes of weakness render the bricks "seconds" and therefore inferior in quality and in selling price, while bricks of the last-mentioned kind go into the work unnoticed and as sound bricks, yet at some time, in case of accident, fire, or the like, when their greatest strength is needed, they fail by reason of these internal weaknesses, often causing great damage.

Recognizing the great cost attending systems heretofore pursued in the manufacture of bricks, the great loss due to exterior chipping by reason of the frequent handling of the same, and finally that less-recognized but equally-important matter of the internal weaknesses developed in the bricks by improper and frequent handling, my present invention has for its object, mainly, the elimination of this frequent handling of the individual bricks either in their green or burned condition; and to this end my invention, generally stated, consists in providing means for taking the molded clay or green bricks as they issue from the brick-making machine or immediately thereafter and building the same into what I call "unit-stacks" of definite dimensions and formation and thereafter maintaining these unit-stacks intact either as so many separate unit-stacks or else in masses made up of a multiplicity of these unit-stacks throughout the entire process of completing the bricks. Thus the original formation of these unit-stacks may take place in the open air or where there is ample light and facility for stacking them accurately, so that at the very beginning of the operation and while they are yet in a green or soft condition they are stacked in such manner as to support one another in the best possible manner to resist unequal or improper pressures or strains, and by reason of the stack formation subsequent individual handling is avoided and consequent chipping. By maintaining these unit-stacks intact throughout the entire subsequent process of brick-making the original formations are maintained and the individual bricks are not subjected to frequently-changing pressures, loads, or strains. In other words, they are dried and burned in precisely the same positions and under the same pressures and supported in the same manner as when originally stacked in their most green or soft condition and, moreover, are not subjected to chipping or other external damage due to the repeated handling of each brick, as heretofore. Thus absolute uniformity in structure of the bricks is maintained, and I find the quality of the same, both externally and internally, is much improved over bricks made in the ordinary and customary manner; also, the time required in the manufacture of the bricks is much reduced, cost is lessened, superior bricks are produced, and the very desirable continuous kiln may be made use of, because of the facility with which the bricks previously piled in stack formations outside the kiln may be deposited bodily within the latter and likewise removed after burning, even at less cost than the building of the old form of kilns now so generally used.

Obviously and to the highest development of my invention the unit-stack formation of bricks originally formed while the bricks are in the soft or green condition are usually maintained not only through the kiln-drying, but subsequently when removed therefrom and piled in the yard or in the cars, thus saving in the handling of the bricks and insuring at all times protection to most, if not all, of the bricks in the stacks from mechanical injury and chipping.

In the drawings, Figure 1 is a top plan view of a brick-yard shown in sufficient detail to make my invention readily understood. Fig. 2 is an enlarged detail in top plan, parts being broken away, showing the various features of construction of a chamber and of the adjoining parts of a kiln, together with certain special constructional details preferably employed in carrying out my invention. Fig. 3 is a central longitudinal section taken through a kiln-chamber, showing the bricks properly piled therein and the crane in position for removing the cover of the kiln. Fig. 4 is a vertical transverse section thereof, showing further details of construction.

I will first explain the details of construction shown in the drawings and will then set forth more particularly the distinguishing characteristics of my system.

In Figs. 2 and 4 I have shown an entire chamber A of a continuous kiln and portions of adjacent chambers A' A^2. Each chamber has at one side (herein shown for convenience as its left-hand side) a partition-wall a' and a flash-wall a, separated sufficiently to provide a fire-box a^2 between them extending the full length of the kiln-chamber, the flash-wall terminating short of the top of the chamber to provide a passage a^3 for the heat, smoke, &c., and the partition a' having at its bottom a plurality of flue-holes a^4. The kiln-chambers have a plurality of flue walls or elevations a^5 extending transversely thereof in a series from one end of the chamber to the other, these flue-walls forming between them flues a^6 and being spaced apart to correspond to the lengths of the bricks which are to occupy the kiln, so that when the bricks are laid on edge lengthwise across the flues end to end throughout the length of the chamber their ends will rest on the middle of the successive flue-walls, as clearly shown in Fig. 3. In alinement with the flues a^6 are perforations or rod-holes a^7 through the flash-walls a, and at the opposite sides of the kiln-chamber are lifting-beam pits a^8, extending preferably below the bottoms of the flues a^6. The kiln-chambers have removable tops, as shown at a^{10}, Figs. 3 and 4, these tops having a width commensurate with the width of the chamber and preferably extending from about the middle of one partition-wall to the middle of the next and being made of any suitable material and in any suitable manner, preferably of hollow construction-tiles a^{12}, joined by tie-rods a^{13}, this construction being light and strong and well adapted for the purpose. At their opposite sides the removable tops are provided with suitable lifting devices (herein shown as forks or straps a^{14}) hooking into the sides of the tops and provided with eyes a^{15} at their upper ends to receive the hooks a^{16} of the lifting apparatus.

I prefer to build the kilns in the earth, as shown in Fig. 3, where it will be observed that the top of the kiln-chamber comes flush with the surface of the ground and the removable top lies normally slightly above the adjacent ground in position to be engaged by the crane, as will presently be described. This construction is relatively inexpensive, as it requires no bracing, and because of the solid abutting earth it retains the heat to the best advantage and withstands rough usage better than other forms of kilns. I have especially devised this form of kiln set in the earth, as stated, for the reason that it is of peculiar advantage in connection with my system, as it enables me to transport enormous masses of bricks with very little up-and-down movement, and it gives a firm steady foundation for the transporting-crane to travel upon.

Referring more particularly to Fig. 2, it will be seen that the flues a^6 and the pits a^8 are occupied by the removable grill or platform on which the bricks are transported, it being understood that the bricks shown in place in the kiln have just been lowered into position and the supporting-platform on which they were carried into position has not yet been removed. This platform consists of longitudinal lifting-beams b, herein shown as heavy I-beams, extending the full length of the chamber and across the rods or lifting-bars b', the latter also being shown for convenience of illustration as I-beams. The lifting-beams b are provided with links or straps b^2 or other suitable engaging appliances for receiving the hooks a^{16} of the lifting apparatus.

I prefer to employ the supporting grill or platform described for the reason that it is exceedingly strong, economical, easily handled, and forms a convenient support upon which the original arrangement of the green bricks in unit-stack formation, where the bricks issue from the brick-machine, may be transported, thus forming a convenient support for maintaining the unit-stack formation of bricks in their transportation throughout the entire process of manufacture, including that of drying, to be described, and kiln-burning, immediately under consideration. I do not intend, however, to limit myself to the particular platform herein shown on which the bricks may be transported, as described, for the reason that I believe myself to be the first to conceive of providing supporting means for carrying a large number of bricks in stack formation into a kiln, said supporting means being removable from the kiln without disturbing the stack formation of the bricks within the kiln, and in this connection I wish also to make it understood that I may employ various features of my invention in connection with modified or substituted apparatus, inasmuch as my invention is broadly new in many particulars, all as more particularly defined hereinafter in the claims, and many mechanisms differing in detail may be employed for carrying out my invention without departing therefrom.

I am aware that kilns have been constructed on the knockdown principle, in which the sides and tops were capable of being taken apart and put together again, and I am aware that holes for depositing coal, &c., have been provided in the tops of kilns; but so far as I am aware there never has been heretofore a kiln constructed with a top which was removable as such, it having been heretofore necessary in case it was desired to open a kiln at the top to break up the top entirely, thereby destroying it, or else to take it to pieces, as just mentioned, in which case nothing remained of the top but the original building materials of which it was built and which might then be used for building the sides or top or any other part of a subsequent kiln or other structure. I provide flue-holes and rod-holes, already described, in order that the rods or bars b' may be pulled out into the adjacent empty kiln-chamber after the bricks are in place, as otherwise they would warp and rapidly deteriorate.

One very important feature of my invention resides in providing an overhead crane, preferably an electric crane, as shown at C, traveling on a track c, running lengthwise of the kiln in position to bring the crane over the individual chambers, said track extending from near the drier to such distance out into the yard as it is desired that the bricks shall be deposited when burned. The track c may extend along the ground, as shown, or be otherwise arranged in proper location in respect to the kiln K and extending out into the yard Y.

The kiln is herein shown as a continuous kiln having a plurality of chambers, each like the one described, although it will be understood that I am not limited in respect to the general kind of kiln, the one herein shown having fourteen chambers. There are two tracks running parallel, one for each series of chambers, and each of these tracks will have its own electric crane, the crane not being herein shown in detail for the reason that any commercial crane may be employed, m herein indicating the motor from which opposite winding-drums m' are operated for raising and lowering the hoisting-chains m^2, and the crane containing other usual mechanism for causing it to travel in the direction required on its tracks.

As already explained, it is of great advantage and importance as to time, expense, and output to do away with the manual handling, and this holds true, although to a less extent, when my invention is employed in part only of its preferred and complete embodiment herein set forth, and therefore I do not intend to restrict myself necessarily to the use of the entire system, as for some purposes it is advantageous to use a part thereof. For example, the kiln and crane, &c., may be employed for handling the bricks in mass, as stated, even though the exigencies of the particular plant or situation make it preferable to remove the bricks from the carrying-platform instead of to remove the latter from the bricks.

I have indicated in a conventional manner at N a brick making or molding machine which may be of any kind desired, and running in usual manner in front of this machine is a track on which trucks or cars may travel for carrying the bricks. Upon these cars, brought successively into position with reference to the brick-machine N, are piled the green bricks, after they issue from the machine, in the original unit-stack formations, that are to be preserved intact throughout the entire remaining process of manufacture of the bricks. This original stack formation may be conveniently and cheaply carried out at this point, where there is ample room and light and every means for insuring accuracy of work. Three loaded cars n', each carrying its unit-stack of bricks, are shown in front of the machine, and an empty car n^2 ready to be put into loading position. These cars are or may be run onto a transfer-car n^3, traveling on a cross-track n^4, and are delivered therefrom onto the transfer-tracks d, upon which the cars n, carrying their unit-stack formations of bricks, are run into the drier D, of usual construction, where the bricks are dried, still remaining in their original unit-stack formations. After the drying process has been completed and in accordance with my novel system the cars carrying these original unit-stacks of bricks are run out from the drier and, it may be, onto a transfer car or truck n^5, traveling on a cross-track n^6, similar to the track n^4, and are preferably run into convenient positions, from which the individual unit-stacks of bricks are transferred bodily and intact, without disturbing the stack formation or the relative arrangement of the individual bricks, upon suitable supports that I have designated as stations S S', conveniently arranged with reference to the kiln. In the drawings the former station is shown in Fig. 1 as unoccupied by bricks and the latter as carrying stacks of bricks ready for transfer to the kiln. The stations are formed in substantially the same way as the bottoms of the kiln-chambers—*i. e.*, they have a series of elevations or low brick walls s corresponding in general shape and arrangement to the flue-walls a^5, these walls being provided to receive the rods or bars b' between them and the bricks upon them above said rods or bars, the same as shown in Figs. 2 and 3 in connection with the kiln-chamber. The beams b will be rested on the ground or other support at the sides of the stations beneath the projecting ends of the bars or rods b', in the same relation thereto as shown in Figs. 2 and 4. The walls s may be made of clay or of wood joists, metal beams, or otherwise, being provided simply for the purpose of supporting the ends of the first layer of bricks the same as do the flue-walls already explained, and preferably they are carried on a hydraulic lift, (indicated at s', Fig. 1.) The first or bottom layer on the stations or supports S S' is or may be composed of burned bricks e or other hard rigid substance which will withstand the action of the fire in the kiln in order to give proper support to the superpiled green bricks g and to receive the contact of the lifting rods or bars. This first or foundation layer of burned bricks e is carefully positioned on the walls s, said burned bricks being placed on edge with spaces between them to form riddles or openings through which the heat may pass into the kiln-flues when the stack subsequently reaches the kiln.

The unit-stacks of dry green bricks are transferred bodily from the car n^5 into proper position upon the layer of burned bricks upon and forming, it may be, a part of the station S or S', and as many of these unit-stacks may be arranged side by side or superimposed one upon the other at these stations S S' as may be necessary to build up a stack of suitable size to substantially fill the chamber of the kiln into which they are to be placed. Thus while the size of the entire mass or stack of bricks is increased, such increased stack or mass is made up of a multiplicity of the small unit-stacks still maintained intact, and after the drying the bricks in the unit-stacks are able to sustain the added weight due to the placing upon them of other unit-stacks, whereas previous to drying they might not be thus able to sustain the increased weight.

When enough unit-stacks to fill a kiln or a section thereof, as desired, have been piled up at the station, the rods or bars b' are run under the burned bricks and between the brick walls s of the stations or supports S S', and then the main lifting-beams b are placed under the projecting ends of the rods or bars b'. Meanwhile the traveling crane C has been brought into position over the particular chamber of the kiln which is to be charged, and the lifting-bales a^{14} of the removable roof thereof have been engaged by the hooks a^{16} of the lifting-chains, and the entire roof of the kiln has been raised and carried away from the chamber. Then the crane is brought over the station on which the large stacks have been formed, and the hooks a^{16} of the crane-lifting chains are caught into the stirrups b^2 of the respective lifting-beams, and the entire mass of accurately-stacked spaced bricks is lifted bodily and transported to the kiln by the overhead traveling crane and is lowered into the kiln until the burned bricks rest at their ends on the edges of the flue-walls, the lifting-rods b' passing down between the flue-walls into the flues a^6. The weight of the bricks is thereby removed from the rods. The rods b' are drawn out transversely to the kiln-chamber through the openings (herein called for convenience "flue-holes" and "rod-holes") in the partition-wall and flash-wall, respectively, into the empty kiln-chamber adjacent, and then when all the rods b' have been drawn out the main lifting-bars b are drawn up by the crane. The cover a^{10} is then brought back and placed in position on the chamber, the partition-walls a' being preferably square and flat at their tops to receive a layer of loose sand as a sand-seal for the cover a^{10}. Then the rod-holes a^7 are closed by means of terra-cotta or brick or other plugs, as indicated at a^9, in order that the heat and gases from the fire in the fire box or boxes may be properly directed. The heat and gases pass over the flash-wall and are drawn downward through the open tortuous passages in the stacked bricks, passing through the riddles formed by the layer of burned bricks into the flues a^6, thence through the flues a^6 and out through the flue-holes a^4, up through the fire-box a^2 of the next kiln and over its baffle or flash wall a, and so on, according to the number of chambers of the continuous kiln which may be occupied. After the bricks are burned and the chamber has sufficiently cooled the cover is taken off, the main lifting-beams are lowered into the pits, the rods are pushed into the flues through the rod-holes and flue-holes from the adjacent empty kiln, and when all are in place each under a row of burned bricks and the crane-chains have been secured to the lifting-beams the whole mass is lifted by means of the lifting-beams and overhead crane and is carried in one body without disturbance to the stock-yard Y, where it is lowered into final position upon brick walls or wood beams arranged to support the ends of the burned bricks precisely as already explained in connection with the kiln. Thereafter, if desired, the bricks may be transferred, still in mass and without disturbing the original unit-stack formation, to the cars or other means of transportation.

From the above description it will be readily evident that a great saving of time and labor is accomplished. Also, the old way of handling the bricks was apt to mutilate the green bricks considerably, due to wheeling or trucking them into the kiln and passing them through so many handling operations before burning. Also, much damage is done to the burned bricks by passing them by hand to wheelbarrows, wheeling them to the stock-yard, and passing them to the stock-piles, whereas my system obviates all this.

The commercial advantages of my invention are of the greatest importance, as they make it feasible to accomplish practically all the transportations of the bricks in the yard with one stacking thereof, and, moreover, it is of great consequence from a commercial standpoint to be enabled to handle the bricks in such large masses, my system enabling me to transport twenty to fifty or more tons of bricks into the kiln, out again, and to the stock-yard without any inconvenience and with a very small amount of expense.

In operating separate kilns under the old methods the removing of the burned bricks from the kiln and the refilling with unburned bricks requires several days' time. Moreover, the removing cannot be commenced until the kiln has well cooled, as the men are obliged to enter it and work in it, while, in addition, a considerable waste of heat takes place; but my improved system enables the bricks to be taken out while yet very hot and a charge of unburned bricks to be put in and the fires reapplied all in a few minutes' time, thereby not only saving a great deal of time, but saving also a large amount of heat and resulting in a large increase of efficiency and capacity of the kilns. Thus with my apparatus a yard with, say, six kilns will produce as many bricks in a season as a yard with, say, ten kilns under the old system.

I do not intend to limit my invention otherwise than as hereinafter expressed in the claims, and it will be understood that while I prefer to employ all the apparatus above described, yet many advantageous results may be obtained by employing various parts of the apparatus aside from the whole thereof, and also certain features of my invention may be employed in other connections and other devices may be substituted for certain parts of the apparatus, all within the spirit and scope of my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for the manufacture of bricks, a kiln, and supporting means for carrying a large number of bricks in stack formation into the burning-chamber of the kiln,

said supporting means being removable from supporting engagement with the bricks without disturbing their said stack formation, substantially as described.

2. In an apparatus for handling bricks during their manufacture, a kiln having an opening in its top, a movable support outside of said kiln for carrying a large number of green bricks stacked in regular formation for burning, lifting mechanism for bodily raising said support and the stack of bricks thereon and moving the same to said kiln and lowering said support and bricks into the kiln, means in the kiln for sustaining said stack of bricks independently of said movable support and without interfering with the original stack formation thereof, and means for withdrawing said movable support from supporting engagement with said bricks during the burning operation, substantially as described.

3. In an apparatus for handling bricks during their manufacture, a kiln having an opening in its top, a movable support outside of said kiln for carrying a large number of green bricks stacked in regular formation for burning, lifting mechanism for bodily raising said support and the stack of bricks thereon and moving the same to said kiln and lowering said support and bricks into the kiln, means in the kiln for sustaining said stack of bricks independently of said movable support and without interfering with the original stack formation thereof, means for withdrawing said movable support from supporting engagement with said bricks during the burning operation, and means for reëngaging said movable support with said bricks after the latter have been burned and for removing the same in their original stack formation from the kiln, substantially as described.

4. An apparatus for the manufacture of bricks, including a kiln for burning the bricks, carrying means for transporting a large number of bricks in stack formation, said means including a plurality of separated parts each engaging a series of said bricks, devices for lowering said carrying means and the bricks thereon into the kiln, and means for removing said carrying means from engagement with said bricks without disturbing said stack formation thereof, substantially as described.

5. A brick-yard having a brick-kiln, a station outside said kiln constructed for supporting the bricks in stack formation, and a transporting device for transporting bricks when arranged in stack formation from one to the other of said station and kiln, said station and kiln each being constructed to permit effective engagement of the said transporting device with the said stack formation of bricks that rest upon said station or kiln, substantially as described.

6. A brick-yard having a brick-kiln, a station outside said kiln constructed for supporting the bricks in stack formation, and a transporting device for transporting bricks when arranged in stack formation from one to the other of said station and kiln, said station and kiln each being constructed to permit engagement of the said transporting device with the said stack formation of bricks that rest upon said station or kiln, and to permit removal of said transporting device after deposit of said stack of bricks, substantially as described.

7. A kiln having one or more kiln-chambers constructed to be charged and discharged through the top only, and a movable cover or covers closing the tops of said chambers and supported by the kiln and permitting the deposit of the bricks in or removal of the same from said chamber or chambers, substantially as described.

8. In an apparatus for manufacturing bricks, a kiln having a removable and replaceable top supported by the kiln and means for transporting to and lowering into the kiln through the top opening thereof the green bricks which are to be burned, substantially as described.

9. In an apparatus for manufacturing bricks, a kiln having an opening in its top, a station outside the kiln whereon the green bricks are stacked and means for lifting the said stacked bricks from said station and transporting and depositing them in the kiln through the opening.

10. The combination with a kiln or kiln-chamber constructed to be filled and discharged through its top, of a removable support to receive a stack of bricks to be deposited in or removed from the kiln, and a movable cover or covers for the kiln, permitting the deposit in the kiln and the removal therefrom of said support with its said stack of bricks, substantially as described.

11. A brick-yard having a brick-kiln, a station outside said kiln, and a removable brick-support, said station and said kiln being formed and arranged to receive said removable support for the transportation by means of said support of a stack of bricks piled thereon from said station into said kiln, combined with a track leading from said station to said kiln, and an overhead crane traveling on said track for carrying said support and bricks between the station and kiln, substantially as described.

12. A brick-yard having a stock-yard, a kiln, and a stacking-station, combined with a movable brick-support for carrying a large mass of bricks, opposite parallel rails including said station, kiln, and yard between them, and an overhead crane traveling on said rails for carrying large masses of bricks piled on said movable support from said station into said kiln, and from the kiln to said stock-yard, substantially as described.

13. A brick-yard having a kiln, a removable top for said kiln, a track adjacent the kiln, an overhead traveling crane to run on said track, in position for removing said remov-

able top, and a movable brick-support to be engaged by said crane for carrying a large mass of bricks for depositing the same in said kiln, substantially as described.

14. A brick-yard, having a kiln, containing one or more burning-chambers constructed to be charged and discharged through their tops only, one or more movable covers for said burning-chambers, combined with an overhead traveling crane and its track arranged adjacent said kiln, said crane furnishing the means for handling said movable cover or covers and for charging or discharging said kiln through the open tops of the chambers thereof, substantially as described.

15. A brick-kiln having flat top walls, and a removable cover extending from wall to wall, and having a flat under side at said walls to rest down upon the latter for closing the kiln, combined with means for entirely removing said cover for opening the entire top of the kiln, substantially as described.

16. A brick-kiln supported at its side by the solid earth and having its top substantially flush with the adjacent surface of the earth, a removable top for said kiln supported by the kiln-walls and means for heating the kiln, substantially as described.

17. The herein-described apparatus for transporting bricks in large masses, comprising a removable support having lifting means to be engaged by an overhead crane, a layer of burned bricks arranged over said support for the bricks to be stacked upon which it is desired to transport, an overhead crane, a track therefor for transporting the support and entire mass of bricks, and a fixed support for a mass of bricks constructed to permit removal of said removable support from the brick mass when placed on said fixed support, substantially as described.

18. A brick-kiln having its bottom composed of a series of flue-walls spaced apart to support the ends of bricks laid thereon, flues or passages between said walls, and pits extending transversely to said flues at the ends thereof, substantially as described.

19. A brick-kiln provided with a removable top supported by the kiln and having its bottom composed of a series of flue-walls spaced apart to support the ends of bricks laid thereon, leaving flues or passages between said walls and beneath the bricks laid thereupon, substantially as described.

20. A brick-kiln having its bottom composed of a series of flue-walls spaced apart to receive the ends of bricks laid lengthwise thereon, flues or passages between said walls, pits extending transversely to said flues at the ends thereof, and openings or holes through the walls of the kiln or between adjacent chambers thereof in line with said flues or passages, substantially as described.

21. A brick-kiln having at each side a partition-wall and a flash-wall separated to form a fire-box between them, the flash-wall being lower than the partition-wall, flues extending across the bottom of the kiln, flue-holes through the bottom of said partition-walls, and rod-holes through the bottoms of the flash-walls, said rod-holes and flue-holes being in alinement with the said flues, substantially as described.

22. A brick-kiln having at each side a partition-wall and a flash-wall separated to form a fire-box between them, the flash-wall being lower than the partition-wall, flues extending across the bottom of the kiln, longitudinal pits at each side of the kiln-chamber extending below said flues, flue-holes through the bottoms of said partition-walls, and rod-holes through the bottoms of the flash-walls, said rod-holes and flue-holes being in alinement with the said flues, substantially as described.

23. The herein-described brick-support for transporting a mass of bricks, comprising opposite lifting-beams and transverse separately-movable carrying bars or rods supported by said beams, and means for engaging said beams with lifting mechanism, substantially as described.

24. A support of the kind described, comprising opposite lifting-beams, and a plurality of transverse carrying bars or rods supported by said beams, combined with a plurality of walls or elevations shaped and arranged to occupy the spaces between said beams and said bars, and to extend above the same for receiving the bricks stacked thereon, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JONATHAN P. B. FISKE.

Witnesses:
GEO. H. MAXWELL,
C. A. NEALE.

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KILN

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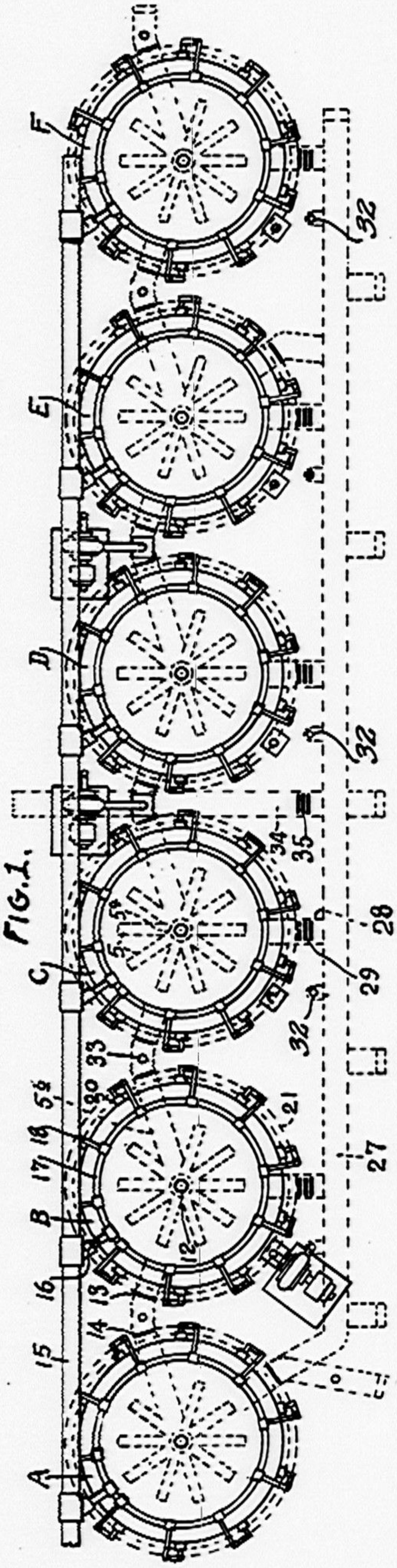
FIG. 1.

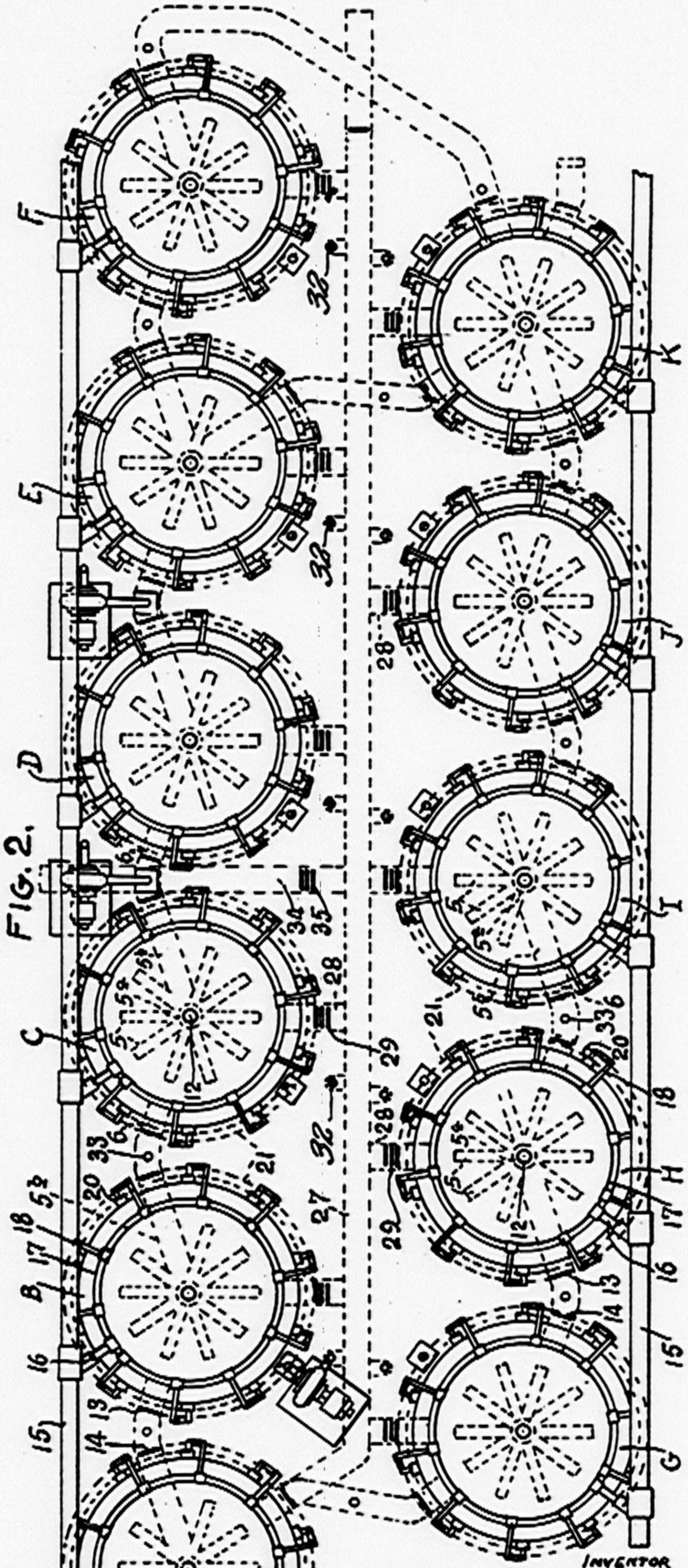
FIG. 2.

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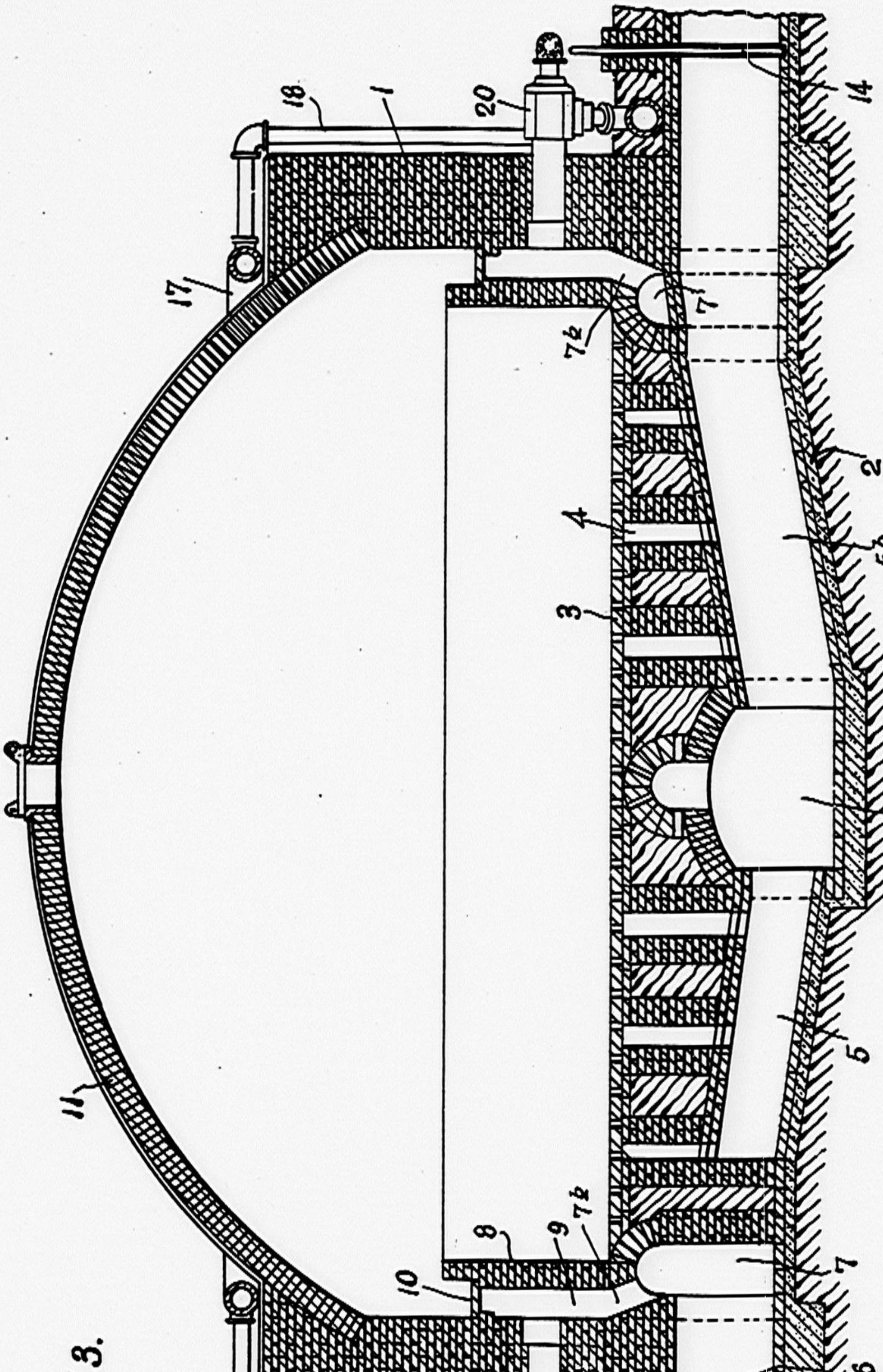

Fig. 3.

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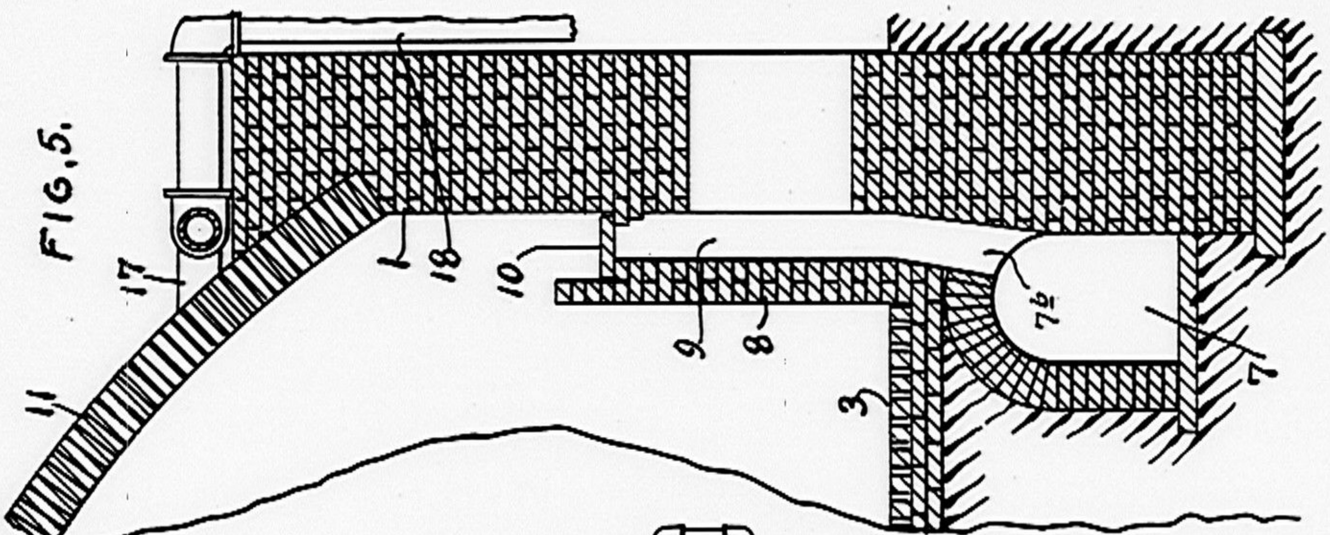

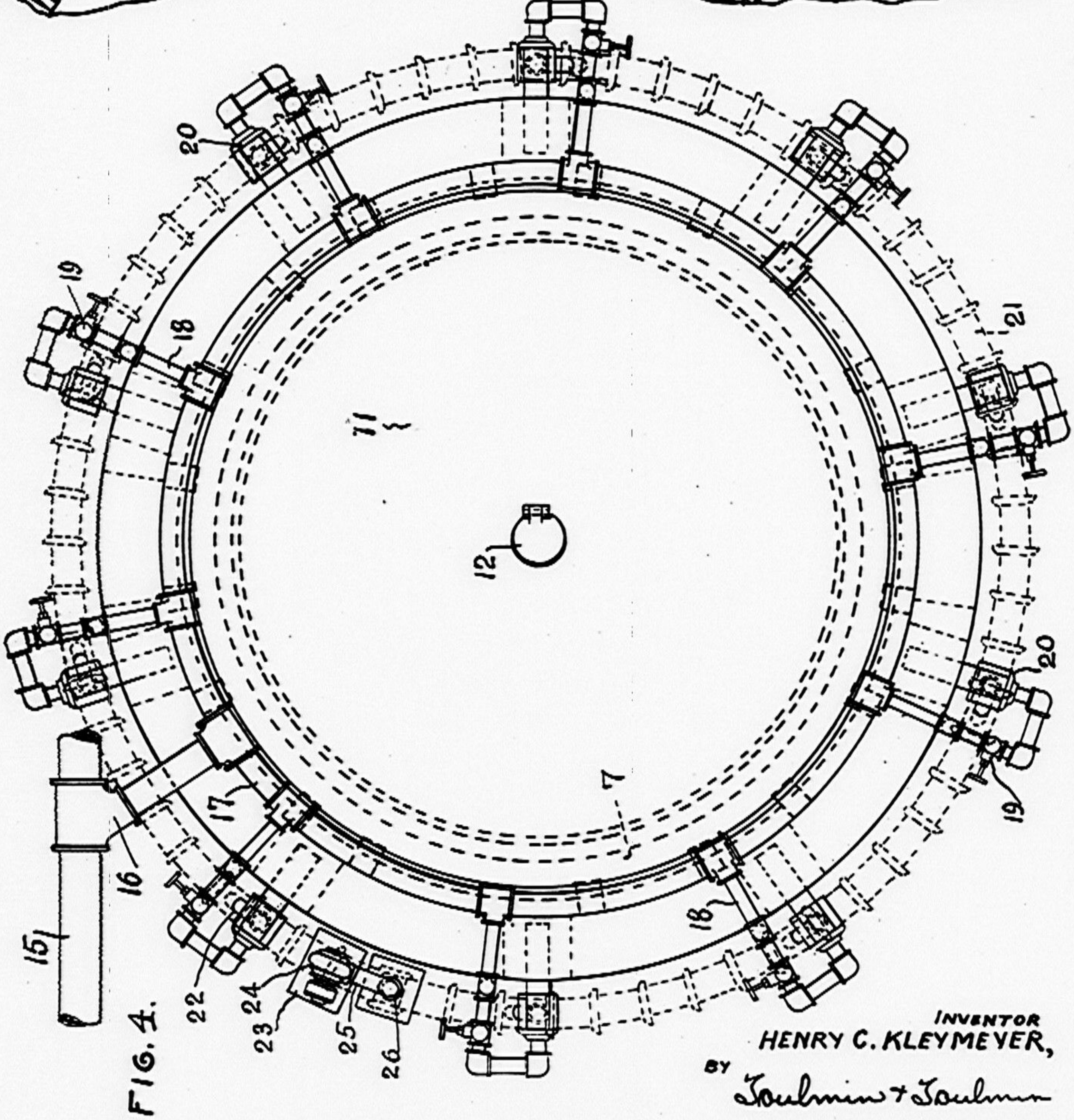

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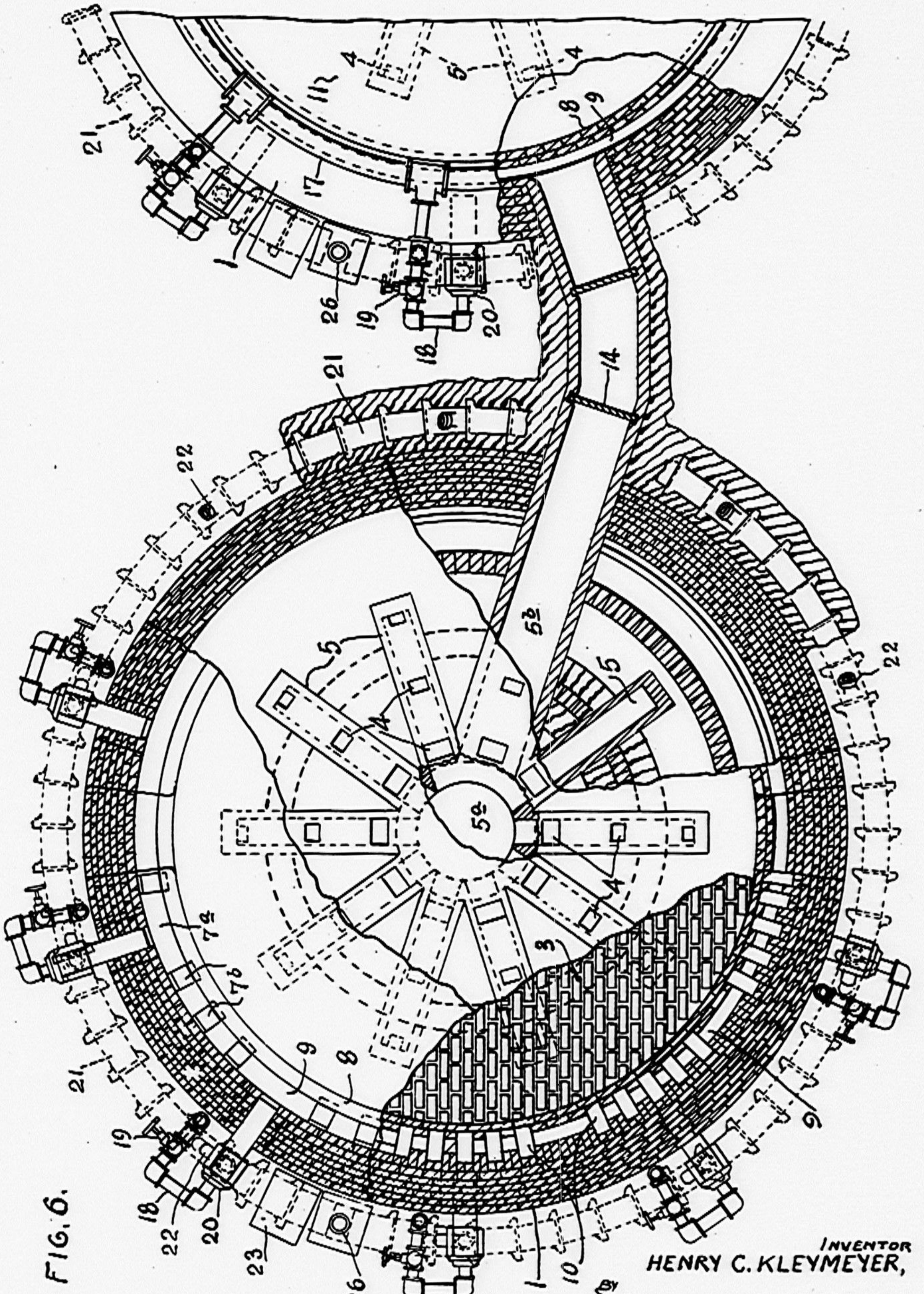

FIG. 6.

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FIG. 7.

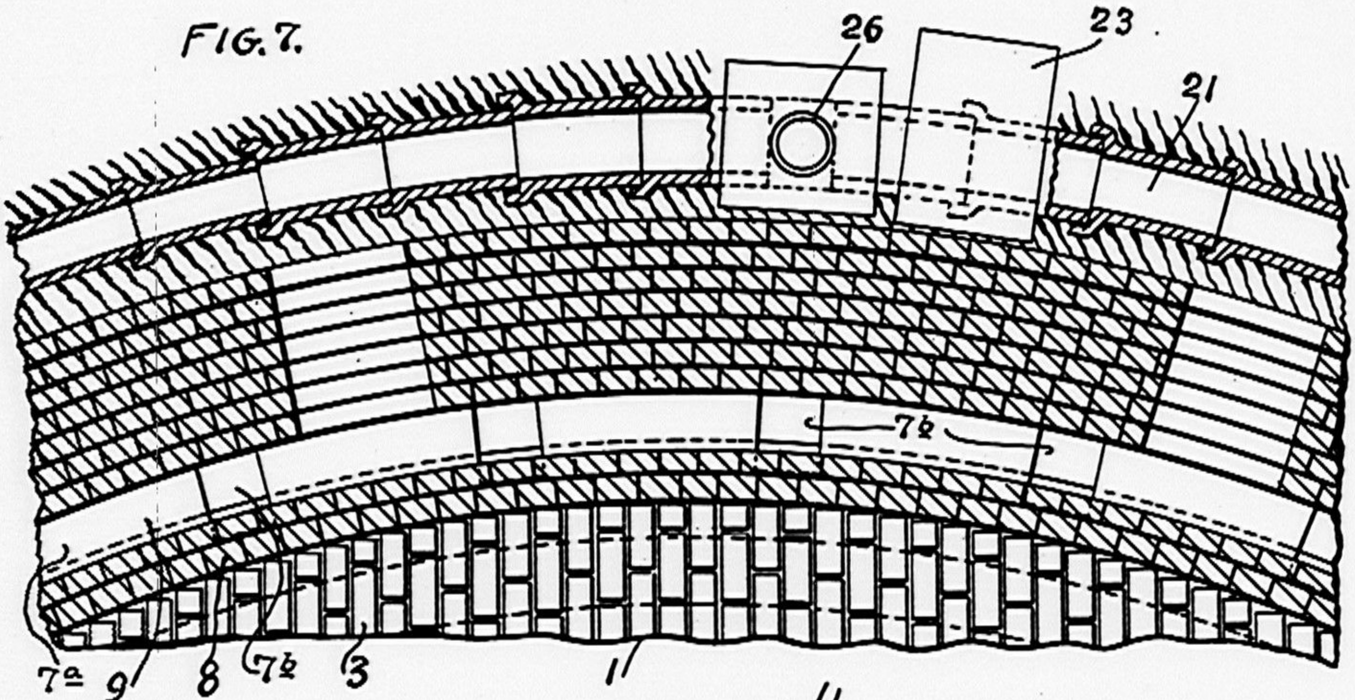

FIG. 9.

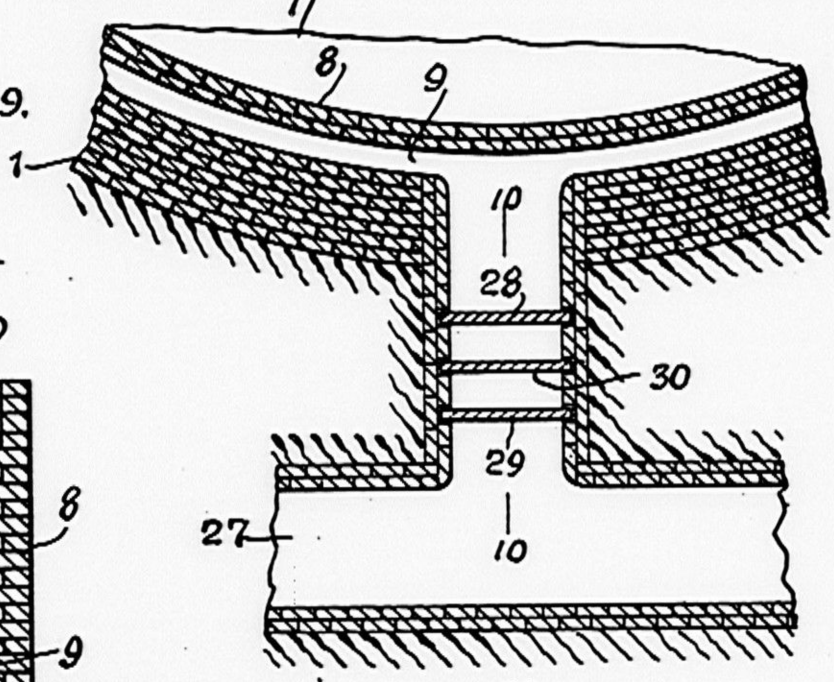

FIG. 8.

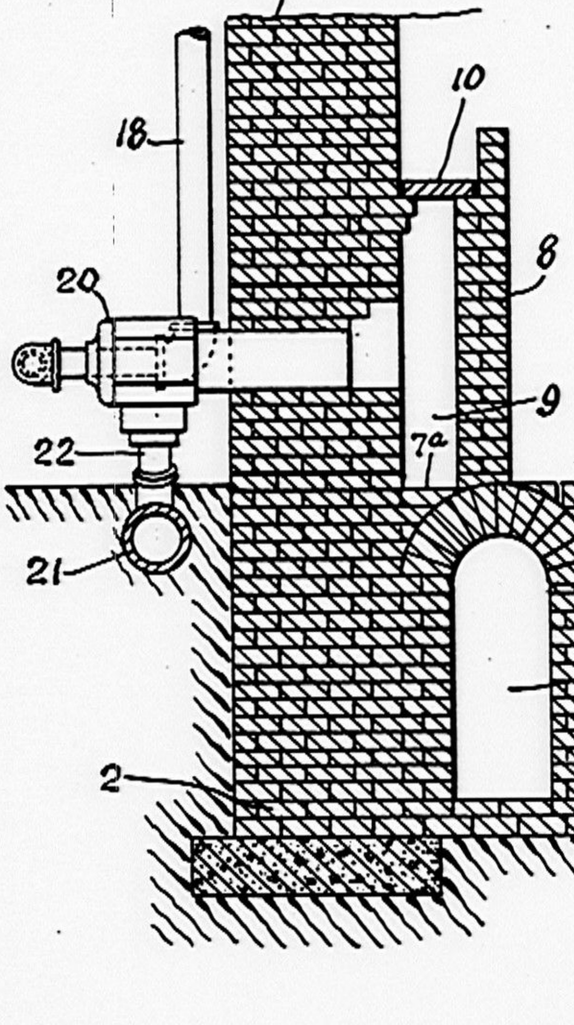

FIG. 10.

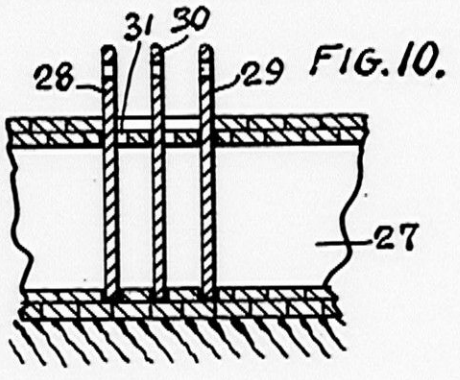

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FIG. 11.

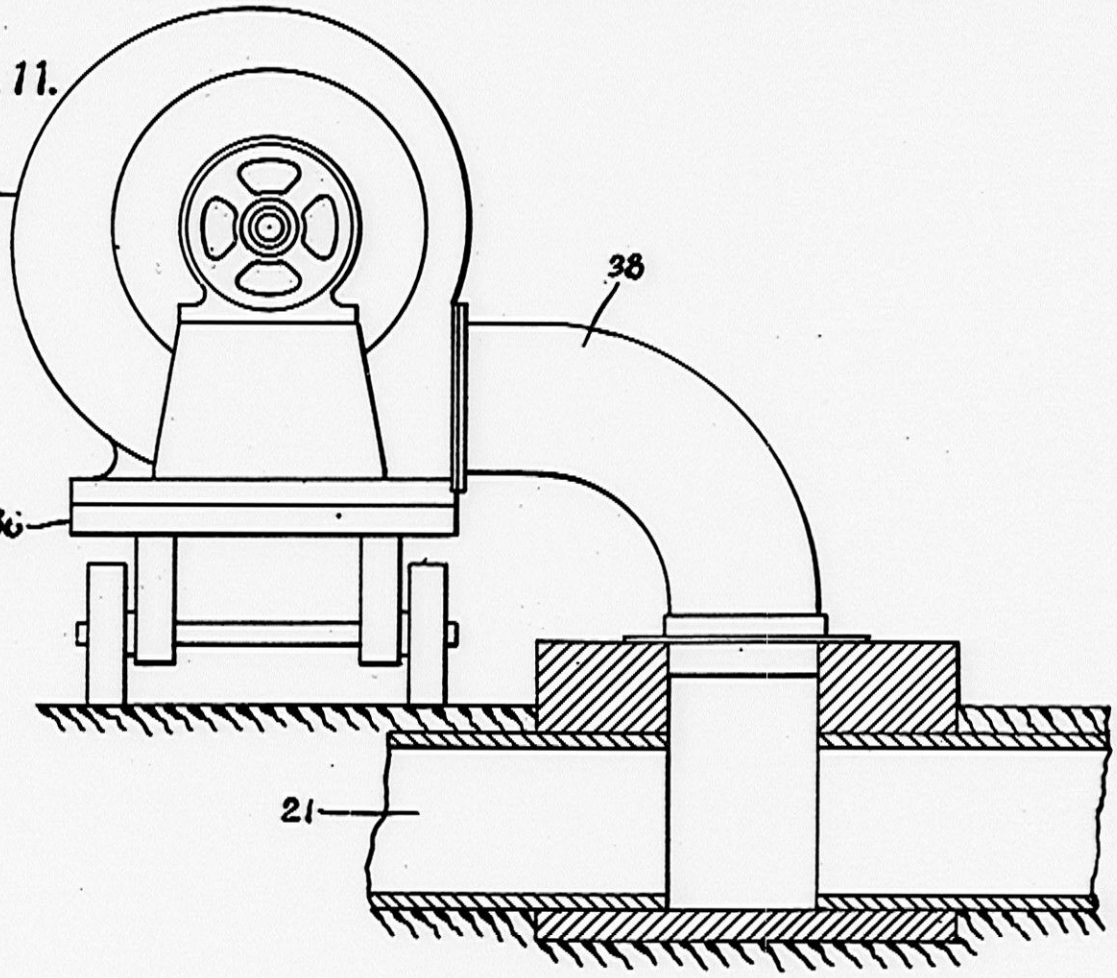
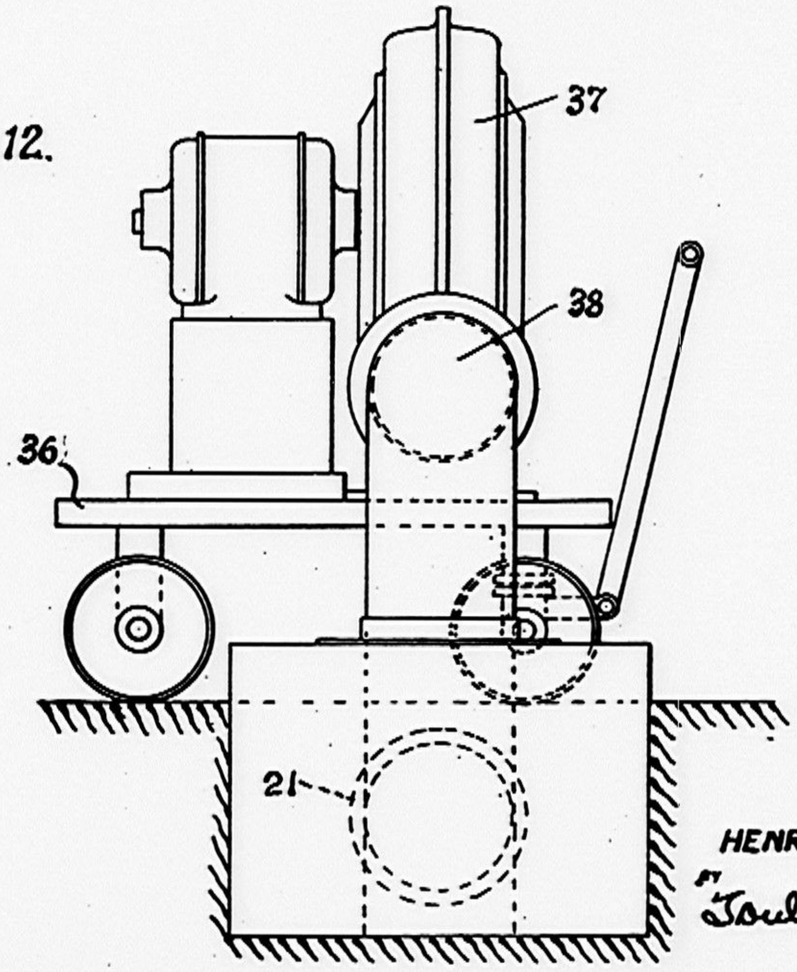


FIG. 12.



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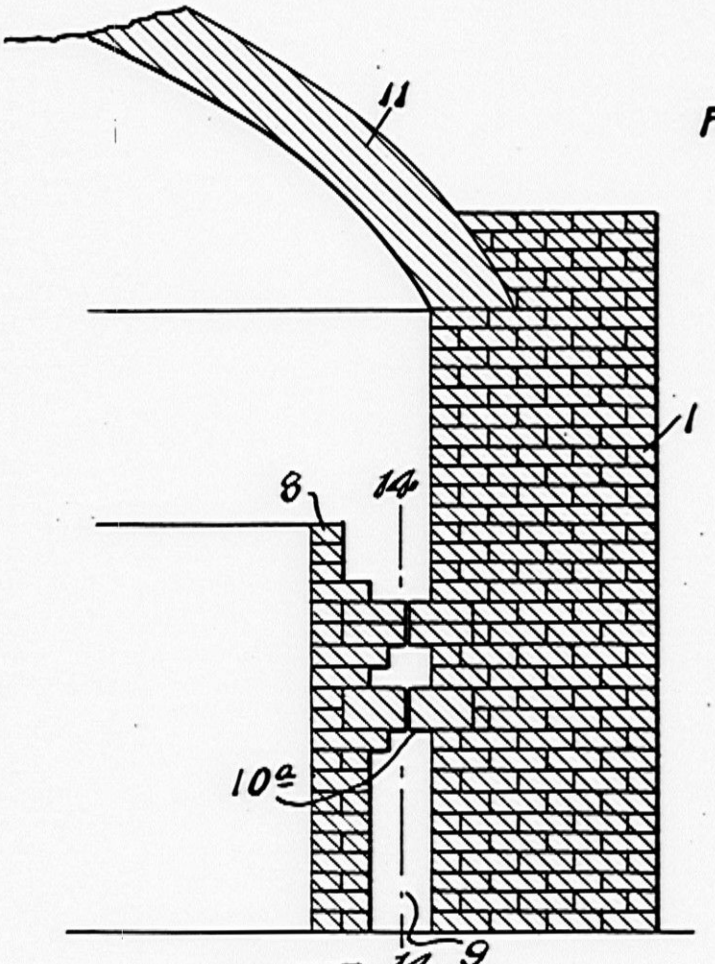
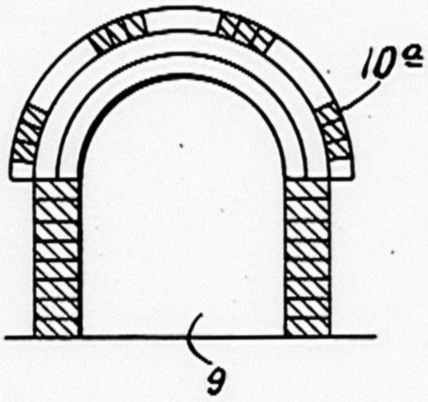


FIG. 13.

FIG. 14.



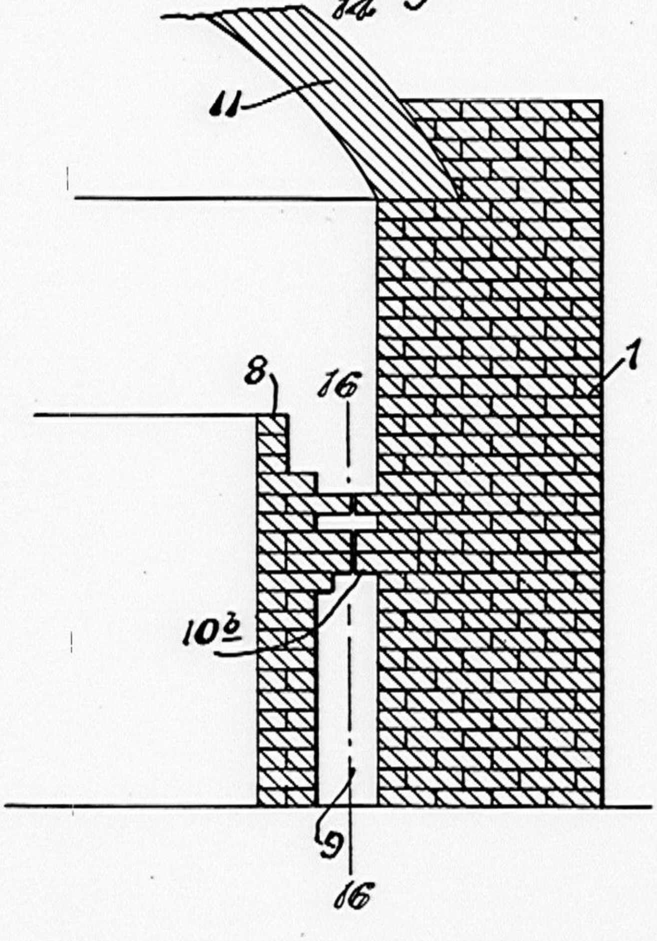
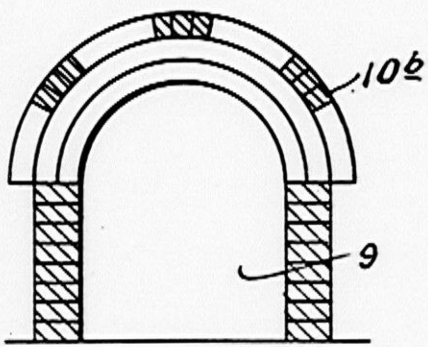


FIG. 15.

FIG. 16.



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Patented June 13, 1933

1,913,599

UNITED STATES PATENT OFFICE

HENRY C. KLEYMEYER, OF EVANSVILLE, INDIANA

KILN

Application filed March 30, 1932. Serial No. 602,041.

This invention relates to improvements in kilns and in the arrangement and connection of a plurality of kilns and the method of heating the kilns in continuous sequence.

It is an object of this invention to provide, in connection with a kiln, means for producing heat and distributing the heat in equal streams around the interior of the kiln, and conducting the heat streams toward the center, and downwardly through the bottom of the kiln. For this purpose there is provided within the kiln, and spaced from the walls thereof, a flash wall providing a combustion chamber into which individual burners project. Immediately above each burner and supported by the flash wall in connection with the main wall, are spaced tiles or slabs forming openings for the distribution of the heat as it rises between the two walls.

It is also an object of this invention to provide, in connection with a plurality of interconnected kilns, means adapted to be associated with one kiln for withdrawing heat from another kiln and for water smoking or preheating purposes.

It is another object of this invention to provide, in connection with a plurality of kilns, means for withdrawing heat from a cooling kiln by causing a current of air through the kiln in a direction reverse to the heating current, and directing the stream of hot air thereby created into a kiln for water smoking purposes. The heated air taken from a cooling kiln may also be used for forced draft in firing a kiln with coal or natural gas, or it may be conveyed to a drying chamber or dryer to dry the green ware as it is made.

It is a further object of this invention to provide, in connection with a plurality of kilns, a waste heat collecting and distributing flue having a connecting flue to each kiln to serve a dual purpose, one to take waste heat out of the kiln that is cooling; the other to allow waste heat to enter the kiln for water smoking purposes. In each connecting flue is a plurality of dampers arranged to prevent the leakage of combustion gas into the waste heat collecting and distributing flue during the firing operation. These plural dampers are so situated that each one aids the other in preventing the escape of the combustion gas from the kiln being fired into the waste heat flue.

It is also an object of this invention to provide a method of heating one or more kilns by drawing therethrough the waste heat or combustion gases from an adjacent or a remote kiln which is burning or being cooled. The method includes the step of drawing cool air through a cooling kiln and the step of forcing the cool air, heated by passing through said cooling kiln, into another kiln for water smoking purposes. It also includes the step of heating one kiln and the step of preheating another kiln by drawing the combustion gases from the kiln being heated through the kiln to be preheated.

These and other advantages will appear from the following description taken in connection with the drawings.

Referring to the drawings:

Figure 1 shows a series of kilns arranged according to the preferred plan in a single row.

Figure 2 shows a double row or series of kilns arranged in a modified plan, so there may be a continuous operation of the kilns without any interruption.

Figure 3 is a vertical, longitudinal section through one of the kilns.

Figure 4 is a top plan view of one of the kilns.

Figure 5 is a vertical section through one side of one of the kilns, showing the construction of the kiln away from the distributing flue.

Figure 6 is a top plan view of one of the kilns and part of another, with sections thereof broken away to show the interior construction of the kiln.

Figure 7 is a fragmentary view showing a horizontal section through one side of one of the kilns, just beneath the surface of the ground, so that the draft flue and a part of the combustion chamber are shown.

Figure 8 is a vertical section through one side of the kiln showing the application of the burner to the kiln.

Figure 9 is a horizontal section through a part of the waste heat tunnel, an adjacent part of the kiln and the connection between the waste heat tunnel and the kiln.

Figure 10 is a section on the line 10—10 of Figure 9.

Figure 11 is a rear elevation of the fan truck.

Figure 12 is a side elevation of the fan truck.

Figure 13 is a vertical section through one side of the kiln, showing another form of spreader.

Figure 14 is a vertical section on the line 14—14 of Figure 13.

Figure 15 is a view similar to Figure 13 but showing a slightly modified form of spreader from that shown in Figures 13 and 14.

Figure 16 is a section on the line 16—16 of Figure 15.

In Figure 1 there is shown a series of kilns arranged in line and connected to one another. These kilns are indicated by the letters A, B, C, D, E and F.

In Figure 2 a ring series of kilns is shown. In this series, in addition to the kilns shown in Figure 1, there are five other kilns designated G, H, I, J and K, connected to each other in the same manner that the kilns of Figure 1 are, and connected to the kilns of Figure 1 at the end of the series.

In Figure 3 there is shown a longitudinal, vertical section of one of the kilns. Each kiln has the usual wall 1, which is circular in shape, with a base 2 made of brick, or other suitable material. The walls are usually made of brick. The floor of the kiln is indicated by the numeral 3, which has openings 4 extending downwardly and terminating in branches 5 that converge into a central chamber 5*a*, from which there is an outlet or distributing flue 5*b*.

This flue 5*b* is connected to the inlet flue 6 of an immediately adjacent kiln. This inlet flue terminates on the inside of the wall of the kiln in a circular chamber 7. Immediately above the circular chamber, and between a flash wall 8 which surrounds the floor of the kiln and the wall of the kiln proper, is a combustion chamber 9. This combustion chamber is separated from the circular chamber 7 by means of a floor or partition 7*a*, which has a plurality of equally spaced holes or openings 7*b* therein for the passage of hot gases. This partition 7*a* with the equally spaced holes therein aids in the distribution of the combustion gases for preheating purposes, and also in withdrawing the hot air from the kilns for cooling purposes.

Arranged at suitable points around the upper edge, and between the wall 1 and the flash wall 8, are horizontal spreaders 10 or arcuate spreaders 10*a* and 10*b*, as shown in Figures 13 to 16, inclusive, which serve to divide the incoming hot gases into a large number of small streams that pass upwardly and engage the dome or crown 11, which is concave in shape and tends to cause the streams of rising gases to converge towards the top of the dome, and take a downward course through the material being burned, and out through the openings 4 in the floor, into the branches 5, to the central chamber 5*a* and outlet 5*b*, which leads into the inlet of the adjacent kiln.

On top of the dome or crown is an opening or hole, closed by a lid or cap 12. In the inlet flue is a damper 13, operated from the ground level. There is a similar damper 14 in the outlet flue 5*b*. Between the flues 5*b* and 6 are openings or fan connections 33, later to be described.

For the purpose of providing gas to the kilns a gas main 15 is provided on one side of the single row of kilns, or on both sides of the double row of kilns. From these gas mains a branch 16 extends to a kiln main 17 for each kiln. These kiln mains extend in a circle around the top of the wall, and have extending therefrom a plurality of branches 18, each having a valve 19 therein to control the flow of gas therein. Each branch 18 terminates in a burner 20, which projects through the wall of the kiln, as snown in Figure 3.

Around each kiln and below the ground surface is an air pipe or draft flue 21, which has extending upwardly therefrom a branch 22 for each burner. The air and the gas come together in the burner in a manner similar to that of a Bunsen burner.

In order that preheated air may be supplied through the draft flue, there is connected with each draft flue a fan base 23, which is adapted to support thereon a fan 24 having an outlet pipe 25 from the fan, and an inlet 26 into the draft flue. By means of this fan and its connection with the draft flue, preheated air is provided to the draft flue for combustion purposes for either natural gas or other kind of fuel.

Adjacent one side of the series of kilns as shown in Figure 1, or between the two rows of kilns as shown in Figure 2, there is a waste heat flue or tunnel 27 connected to the interior of each kiln by means of a connecting flue 28 leading to the combustion chamber 9. In each connecting flue there are three dampers 29, arranged in spaced relationship to each other, as shown in Figures 9 and 10. These dampers extend through slots 31 in the roof or top of the connecting flue and fit in slots 30 in the sides and in the bottom thereof.

The roof or top of the connecting flue between the dampers has a limited amount of open space to the atmosphere controlled by sliding plates, which prevent or break the suction created on either side of the dampers in the connecting flue. These dampers are primarily for the purpose of preventing the combustion gases from being drawn out of the burning kiln and entering into the waste heat flue.

Along the waste heat tunnel are connecting flues 28 for withdrawing waste heat from cooling kilns into the waste heat tunnel and delivering it to the kiln being water smoked. There is one connecting flue 28 from each kiln to the waste heat flue 27 to be used for a dual purpose. First, to draw the waste heat out of a cooling kiln into flue 27: second, to provide an inlet from the waste heat flue 27 into the kiln for water smoking purposes.

Branching off from the waste heat flue or tunnel is a flue 34 for conveying hot air or waste heat to a drying chamber. This flue is controlled by three dampers 35, similar to the dampers 29. The fan for withdrawing hot air or combustion gases from one kiln and delivering them to another is shown in Figures 11 and 12, and consists of a fan 37, supported on a truck 36. This fan has an inlet 38 adapted to be connected to an outlet 33 in a passageway formed by the flues *5b* and 6 or to an outlet 32 at one side of the waste heat flue.

In operation the various kilns are in different heat conditions at any time of operation. In order to clearly bring out the operation of the series of kilns, it is supposed that kiln B is burning; kiln A is cooling; kiln C is preheated; kiln D is water smoking, while kiln E is being filled and kiln F is being emptied. At this stage of operation one of the fans is forcing air into the draft flue, and for that purpose is attached to the fan platform, as shown in Figure 4.

The kiln A has its damper 13 closed and damper 14 open so that fresh air passes in beneath the floor of the kiln, up through the floor, down through the combustion chamber and out into the waste heat tunnel for preheating, water smoking and drying purposes.

During the time that the kiln B is burning a fan is applied to the outlet of kiln C so that hot gases are drawn from kiln B, through the kiln for preheating purposes. The burning kiln has been heated to a temperature of about two thousand degrees, and by drawing the hot gases from the burning kiln, through the preheating kiln, the temperature of the preheating kiln is raised to about 800 degrees. This operation continues until the burning in kiln B is finished and the material in kiln C has been preheated for burning purposes. At the same time hot air and waste heat are being drawn from the cooling kiln A, and driven into the water smoking kiln D. By means of the hot air and the waste heat this kiln is heated to a temperature of about 200 degrees. This is sufficient to remove the remaining moisture from the material in the kiln preparatory for the step of preheating.

After the burning has been finished in kiln B, kiln C becomes the burning kiln; kiln D becomes the preheating kiln, and kiln E becomes the water smoking kiln; kiln F is the filling kiln and kiln A becomes the emptying kiln and kiln B is the cooling kiln. The process described in connection with the burning of kiln B is repeated.

By means of the arrangement of kilns herein set out, no or a very small loss of heat takes place because the heat is conducted from one kiln directly to another, where the heat is used for various purposes. In order to facilitate this movement of hot gases from one kiln to another, movable fans are provided, which directly drawn the hot air and gases from one kiln into an adjacent kiln, or another kiln colsely adjacent.

By this means there is provided a method by which the hot gases from a burning kiln are directly conveyed to another kiln for preheating purposes and the hot air from a recently burned kiln to still another kiln for water smoking. The essential or primary steps in their preferred sequence are as follows: Drawing cool air from the atmosphere through a flue *5b* at the opening 33, leading it through the bottom draft flue system of a cooling kiln, through the ware therein, where the cool air is heated, and the step of inducing this air, thus heated, through another kiln for water smoking or drying purposes; and also of the step of firing a kiln to a high temperature and drawing all of the heat therefrom through another kiln for preheating. It is particularly a part of the present method to take, by appropriate steps, heat from one kiln and cause it to pass through one or more other kilns without having passed through intervening kilns. No long circuitous flues are necessary, and no long connecting flues or tunnels are used at any period in the operation of this apparatus, or in any period in the heating of the kilns.

I desire to comprehend within my invention such modifications as may be embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a kiln, a burning chamber having a floor with openings therein, a wall around the floor and an arcuate dome on the wall, and means associated with the wall for delivering heat equally to all parts of the dome adjacent the wall, said means comprising a flash wall and spaced blocks between said walls.

2. In a kiln, a floor having openings therein, an annular chamber having an inlet flue, an outlet flue beneath the floor having connections with said openings, a main wall having a dome thereon around the floor, a flash wall spaced from the main wall and forming

therewith a combustion chamber, and a partition between the two chambers having openings leading from one to the other.

3. In a kiln, a floor having openings therein, an annular chamber having an inlet, an outlet beneath the floor having connections with said openings, a main wall having a dome thereon, a flash wall spaced from the main wall and forming therewith a combustion chamber connected to the annular chamber by small spaced openings, and means in the combustion chamber for producing heat and distributing it equally to all parts of the dome adjacent the main wall.

4. In a kiln, a floor having openings therein, an outlet beneath the floor having connections with the openings, a main wall around the floor, a dome on the main wall, a flash wall spaced from the main wall and forming therewith a combustion chamber, a plurality of burners in said main wall around the combustion chamber, a gas pipe having a connection with each burner, an air pipe having a connection with each burner, and a portable fan adapted to be connected to the air pipe for delivering fresh air thereto.

5. In a kiln structure, a plurality of kilns, each kiln consisting of a main wall, a dome on the main wall, a flash wall spaced from the main wall and forming therewith a combustion chamber, and a floor having openings therein, an inlet for each kiln leading to the combustion chamber, and an outlet for each kiln connected to the openings in the floor and connected to the inlet of an adjacent kiln.

6. In a kiln structure, a plurality of kilns, each kiln consisting of a main wall, a dome on the main wall, a flash wall spaced from the main wall and forming therewith a combustion chamber and a floor having openings therein, an inlet for each kiln leading to the combustion chamber, an outlet for each kiln connected to the openings in the floor and connected to the inlet of an adjacent kiln, and a waste heat flue connected to each kiln.

7. In a kiln structure, a plurality of kilns, each kiln consisting of a main wall, a dome on the main wall, a flash wall spaced from the main wall and forming therewith a combustion chamber and a floor having openings therein, an inlet for each kiln leading to the combustion chamber, an outlet for each kiln connected to the openings in the floor and connected to the inlet of an adjacent kiln, a waste heat flue, and a flue having a damper therein connecting each kiln to the waste heat flue.

8. In a kiln structure, a plurality of kilns, a waste heat flue, a branch flue between each kiln and the waste heat flue, and a triple damper means in each branch flue.

9. In a kiln structure, a plurality of kilns, a waste heat flue, a branch flue between each kiln and the waste heat flue, and a triple damper means in each branch flue, said triple damper means having a limited amount of open space to the atmosphere controlled by a movable plate to break the suction created on either side of the damper.

10. In a kiln structure, a plurality of kilns, a waste heat flue, a branch flue between each kiln and the waste heat flue, and a triple damper means in each branch flue, said triple damper means having a limited amount of free space to the atmosphere controlled by an iron plate which may be moved to give the proper opening to break the suction in the flue.

11. In a kiln structure, a main wall, a flash wall spaced from the main wall to form a combustion chamber, a plurality of burners projecting through the main wall to the combustion chamber, and spreaders between the wall for each burner to divide the hot gases into streams.

12. In a kiln structure, a main wall having a dome, a flash wall within and spaced from the main wall, a plurality of burners projecting through the main wall, means between the the walls to direct the hot gases upwardly, and spreaders adjacent the upper edge of the flash wall to divide the hot gases from each burner into small dispersed streams.

In testimony whereof, I affix my signature.

HENRY C. KLEYMEYER.

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DISTRICT OF COLU[illegible]
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BRIEF FOR APPELLEE

United States Court of Appeals

DISTRICT OF COLUMBIA

APPEAL NO. 8776

JOHN R. CLARK, APPELLANT

v.

CONWAY P. COE, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

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Solicitor, United States Patent Office,
Attorney for Appellee.

R. F. WHITEHEAD,
Of Counsel.

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United States Court of Appeals

DISTRICT OF COLUMBIA

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JOHN R. CLARK, APPELLANT
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CONWAY P. COE, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

INTRODUCTION

This is an appeal from the Judgment (12)[1] of the District Court of the United States for the District of Columbia dismissing the complaint in an action, brought under the provisions of Section 4915 R. S. (U. S. C., title 35, sec. 63), as to claims 4 and 5 of the application for patent of the appellant John R. Clark, Serial No. 263,507, filed March 22, 1939.

STATEMENT

The application discloses a brick-making kiln of a continuous type comprising an annular arrangement of a series of compartments separated from each other by radial partitions. Hoods are arranged to move over the floor to contact with the partitions to form chambers in which hot air is brought into contact with the bricks which have been tiered on the floor of the kiln.

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[1] The numbers in parentheses throughout this brief refer to pages of appellant's appendix.

The two claims on appeal are very broad and make no reference to the partitions.

These claims read as follows:

> 4. A brick kiln including a circular multipart kiln floor, and hoods mounted on said floor and arched over the latter, said hoods being movable for selective positioning over the floor parts.
>
> 5. A brick kiln including a continuous kiln floor, hoods arched over a portion of said floor and movable for positioning over the latter.

The Guthrie patent, No. 215,606 (102) discloses a plant lay-out comprising a fixed annular kiln at the center of which, from a moulding machine mounted on a rotary turntable, ware is conveyed to the kiln chamber to be set. This patent shows a brick-making plant of the same generic type as that shown in appellant's application.

The Fiske patent, No. 633,955 (122), shows a battery of kiln chambers covered by a portable crown. These chambers may be grouped and fired with a down draft.

The Swiss patent (95) discloses a method of firing ware in which a portable hood is placed over the ware and application of heat is made to the latter.

The Patent Office recognized that the plaintiff, in the apparatus disclosed, had made an invention since claims 1, 6–8, 13, 15, 20, and 22–25 were allowed by the Examiner (81) and in addition claim 3 was allowed by the Board of Appeals (90). The District Court held that appellant was entitled to claims 2 and 11 (12).

Claims 4 and 5 were held by all the tribunals to be unpatentable in view of the Fiske patent and the Swiss patent, each of them holding that these claims, in view of these two references, defined no invention.

SUMMARY OF ARGUMENT

(1) Claims 4 and 5 of the appellant's application define no invention over the prior art.

(2) Said claims 4 and 5 do not include the partitions with which the kiln floor is provided and which coact with the hoods to provide chambers and there is nothing in the specification to suggest that without the partitions the kiln could be operated for the purpose intended.

ARGUMENT

The question presented by the appeal is whether the two claims 4 and 5 define any invention over the prior art. In appellant's brief great stress is placed on the successful use of the apparatus.

Commercial use is, at the best, but a weak basis for determining the question of patentability and certainly successful use of a kiln of the type here shown does not establish the patentability of claims which merely state very broadly the combination of certain features which by no means include the apparatus as a whole.

The Fiske patent discloses the equivalent of an annular series of kiln chambers in which a crown is moved from chamber to chamber and, as the examiner stated, there was nothing new, in view of the Swiss patent, in having a portable hood which is alternately placed over the settings of brick or other ware. In view of these patents claims 4 and 5 are clearly lacking in patentability. As the District Court expressed it (8), there was no patentable difference whether the movable wall to be placed over the chambers was a flat wall or what appellant refers to as a hood and it was not new to use a structure such as that shown in the Swiss patent which is broadly a hood.

It is submitted that claims which refer only broadly to those features were properly refused. These broad claims are not allowable for another reason. There is nothing in the specification to indicate how the hoods are to be used to form chambers in which the ware, specifically bricks, can be successively dried, baked, and cooled in the absence of partitions with which the hoods form chambers (63). It is stated in the specification (64) that in order to prevent the escape of the heating gasses from the chambers suitable seals are provided which are adapted for engagement with "the free marginal edges of each of the partitions."

On page 10 of appellant's brief it is stated that "for adequate protection of appellant's invention claims should be allowed which do not include partitions."

No reason is stated in the brief for that conclusion and it is submitted that the allowance of these claims would be entirely inconsistent with the theory of this Court as laid down in its decision of June 19, 1944, in *Special Equipment Company* v. *Coe,* — U. S. App. D. C., — F. (2d) —, 62 U. S. P. Q. 12.

CONCLUSION

It is submitted that the Judgment of the District Court was correct and should be affirmed.

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R. F. WHITEHEAD, *Of Counsel.*

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